

Compliance Program Guidance Manual

Chapter – 45 Biological Drug Products

Inspection of Biological Drug Products (CBER) 7345.848

Implementation Date: October 1, 2010 Completion Date: Ongoing

Product Codes:	Programs/Assignment Codes:
57A Antitoxins (e.g., Botulism Antitoxin)/ Antivenins (e.g., snake, spider)	45848A Pre-License Inspection -Allergenic
57B Immunization Toxoids (e.g., Diphtheria Toxoid, Tetanus Toxoid)	45848F Level 1 CGMP Inspection - Allergenic
57C Viral Vaccines (e.g., Rabies, Yellow Fever, Small Pox, Influenza Vaccines)	45848G Level 2 CGMP Inspection- Allergenic
57E In-Vivo Diagnostic Products (e.g., Tuberculin PPD (skin test))	45848B Pre-License Inspection -Vaccines
57G Allergenic Products (e.g., Allergenic Extracts, animal allergens, venoms)	45848C Level 1 CGMP Inspection -Vaccines
57H Bacterial Vaccines/Antigens (e.g., Pneumococcal Vaccine, Meningococcal Polysaccharide Vaccine)	45848D Level 2 CGMP Inspection –Vaccines
57I Multiple Vaccine/Multiple Antigen Preparations (e.g., Measles, Mumps, Rubella Vaccine; Diphtheria, Tetanus, and Pertussis Vaccine)	45848H Off Year Flu PAC
57M Human Hematopoietic Cells (e.g., Umbilical Cord Blood Stem Cells)	42848A Pre-License Inspection - Plasma Derivatives
57N Human Cell and Gene Therapies (e.g., Cell Therapies, Vectors, Genetically Modified Cells)	42848F Level 1 CGMP Inspection - Plasma Derivatives
57U Blood Derivatives (e.g., Albumin, Immune Globulin	42848G Level 2 CGMP Inspection - Plasma Derivatives
57Y Biological In-Vivo and In-Vitro Diagnostic Products Not Elsewhere Classified (N.E.C.)	42848B Pre-License Inspection – Recombinant Analogues
	42848C Level 1 CGMP Inspection – Recombinant Analogues
	42848D Level 2 CGMP Inspection – Recombinant Analogues
	41848A Pre-License Inspection - Somatic Cell and Gene Therapy
	41848F Level 1 CGMP Inspection - Somatic Cell and Gene Therapy
	41848G Level 2 CGMP Inspection - Somatic Cell and Gene Therapy
	41848B Pre-License Inspection – Licensed Hematopoietic Progenitor Cell
	41848C Level 1 CGMP Inspection - Licensed Hematopoietic Progenitor Cell
	41848D Level 2 CGMP Inspection - Licensed Hematopoietic Progenitor Cell

FIELD REPORTING REQUIREMENTS

Send Establishment Inspection Reports (EIRs) that contain issues requiring policy development or clarification to the Center for Biologics Evaluation and Research (CBER) for review. Send the EIR and relevant exhibits (**electronically, if possible**), to CBERInspections@fda.hhs.gov, or by mail to:

Division of Inspections & Surveillance, HFM-650
Office of Compliance and Biologics Quality
Center for Biologics Evaluation and Research
Food and Drug Administration
1401 Rockville Pike, Suite 200N
Rockville, MD 20852-1448

Domestic Post-Market Inspections:

Inspections classified NAI and VAI: Notify CBER, Office of Compliance and Biologics Quality (OCBQ), Division of Inspections and Surveillance (DIS) HFM-650 at CBERInspections@fda.hhs.gov when EIRs are available in Turbo EIR. Do not submit exhibits unless specifically requested.

Inspections classified OAI: Send a complete copy of the EIR, including exhibits, and the FACTS coversheet with endorsement and classification to OCBQ/DIS/HFM-650.

Regardless of classification, send the complete original report, with exhibits, to the home district.

Foreign Post-Market Inspections:

CBER acts as the “home district” for foreign inspections of CBER-regulated products. Send the complete original EIR, with exhibits, to OCBQ/DIS/HFM-650, regardless of recommended classification.

Pre-license and Pre-approval Inspections

CBER acts as the "home district" for all pre-license and pre-approval inspections of CBER-regulated products, whether foreign or domestic. Send a copy of the signed original EIR and Form FDA 483 to OCBQ/DIS/HFM-650 and include the complete original EIR, with exhibits, in the license application file documents as per current CBER standard operating procedures.

Inspection Reporting – Endorsement Section of EIR

The FACTS endorsement (Inspection Summary field) shall include the inspection level and the systems inspected for a level II inspection in addition to the information specified in the Investigations Operations Manual (IOM).

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PART I - BACKGROUND

CBER-regulated biological drug products include fractionated blood and their recombinant analogues; antitoxins; allergenic products; vaccines; products of manipulated, cultured or expanded human cells, and gene therapy products that introduce genetic material into the body to replace faulty or missing genetic material.

CBER is responsible for ensuring biological drug products are safe and effective, and are in compliance with FDA and other applicable laws and regulations. Biological drug products are licensed under Section 351 of the Public Health Service (PHS) Act (42 U.S.C), and fall within the definition of a drug, found in Section 201(g)(1) of the Food, Drug, and Cosmetic Act (FD&C Act), and are inspected under the provisions of both the PHS Act and the FD&C Act.

Biological drug products are subject to the applicable regulations promulgated under both Acts, including the Current Good Manufacturing Practice regulations (CGMPs), which are found in Title 21 Code of Federal Regulations (CFR), Parts 210 and 211, and the Biologics regulations, 21 CFR Parts 600-680. In addition to the above, human cells, tissues, and cellular and tissue-based products regulated as biological drug products are also subject to the Registration and Listing, Donor Eligibility, and Current Good Tissue Practice (CGTP) regulations in 21 CFR Part 1271. Section 501(a)(2)(B) of the FD&C Act requires that biological drug products be manufactured in compliance with CGMPs. CGMP regulations apply to the manufacture of biological drug products and CGMP principles apply for the manufacture of biological intermediates and drug substances under Section 501(a)(2)(b) of the FD&C Act, and the Biologics regulations under 21 CFR Part 600.

Establishments must also comply with their FDA-approved biologics license application (BLA) commitments, and applicable standards. Biological drug products include a wide variety of indications, dosage forms and manufacturing processes, all of critical importance to promoting and protecting the public health. To help ensure the industry produces these important biological drugs to be consistently safe, pure, potent, and effective, FDA conducts CGMP inspections of each establishment at least biennially. Pre-license inspections (PLI) for new biological products and pre-approval inspections (PAI) for significant changes to a biologics license application are performed to ensure compliance with the regulations prior to approval of a new license or significant change to the license.

To provide more effective and efficient regulation of biological drug products, the Office of Regulatory Affairs (ORA) and CBER established Team Biologics in 1997 to conduct routine and compliance follow up CGMP inspections of biological drug product manufacturers, including blood establishments. Team Biologics uses the investigative skills of ORA and the medical/scientific and product expertise of CBER, to promote and protect the public health through coordinated, integrated assessments of the compliance status of biological drug manufacturers. CBER conducts the PLIs and PAIs utilizing the CGMP requirements and the scientific expertise of CBER reviewers.

This compliance program builds upon the knowledge gained during previous FDA inspections of the biological drug and tissue industries. It reflects the objectives identified in FDA's Strategic Action Plan for developing and implementing new inspection approaches using a resource efficient, risk-based approach to provide high quality, cost-effective oversight of industry manufacturing, processing, and distribution of biological drug products to reduce risk.

This systems-based risk-management approach identifies key systems and three critical elements within each system that are common to establishments making biological drug products. Most biological drug products covered under this compliance program were identified as critical to public health (e.g., sole source, important medical need; childhood vaccines, etc.), and most biological drug products are aseptically processed. These factors help form the basis for establishing appropriate levels of inspection coverage under this risk-based program.

This program also establishes two levels of inspectional coverage to evaluate an establishment's compliance with applicable CGMP regulations; Level I (Full) – a comprehensive evaluation of at least four systems, and Level II (Abbreviated) – an evaluation of one mandatory system, plus one additional system on a rotating basis. This approach is similar in concept to that set forth in CBER's CPG 7342.001- Inspection of Licensed and Unlicensed Blood Banks, Brokers, Reference Laboratories, and Contractors, that incorporates a systems-based approach with critical elements to be covered within each system, and a Level I/II inspection option.

This risk-based quality management approach focuses on the key operating systems within the facilities and the two-tiered inspection option provides a method to focus the inspectional coverage and resources appropriate for each inspection, and to implement the appropriate advisory, administrative, or regulatory action, when necessary.

Continued biennial inspections under this compliance program will:

- Safeguard the public health by reducing the risk of adulterated or misbranded biological drug products reaching the marketplace;
- Increase communication between the industry and the Agency, and
- Provide timely feedback during inspections to improve their compliance with CGMP's.

Subsequent to implementation, CBER will annually evaluate its experience with this systems-based program to determine its effectiveness, and to assess and improve the quality of the CBER products inspections program.

PART II- IMPLEMENTATION

A. Objective

Beginning in December 2004 this compliance program originally combined and replaced the compliance programs for licensed allergenics (7345.001), licensed vaccines (7345.002), plasma derivatives (7342.006) and therapeutic drugs (7341.001). This current version adds, for the first time, minimally manipulated, unrelated allogeneic placental/umbilical cord blood (Hematopoietic Progenitor Cells, Cord [HPC-C]), This program represents a continuing compliance and surveillance activity conducted to ensure that CBER-regulated biological drug products for human use are safe, pure, potent, effective, and appropriately labeled. The inspection of a facility is performed to ensure that manufacturers are making biological drug products that:

- Meet the standards described in applicable provisions of the regulations. These include regulations in 21 CFR Parts 600, 601, 610, 640, 660, 680, and 1271, and CGMP regulations in 21 CFR Part 200, 201, 210 and 211.
- Meet any additional conditions of licensure in the approved Biologics License Application (BLA) and/or supplements, if manufacturing a licensed product, and other applicable standards.

This compliance program provides inspectional guidance to investigators, inspectors, and product specialists assigned to perform biennial, for cause, PLI, and PAI inspections of manufacturers of CBER-regulated biological drug products, and provides administrative/regulatory guidance for the compliance officer (CO) or investigator (hereinafter referred to as “investigators”). It includes information regarding noncompliance with applicable regulations, provides information necessary to evaluate overall operations, including quality assurance and quality control programs of the inspected facilities, and ensures that appropriate enforcement actions are initiated against those manufacturers found to be in significant noncompliance with applicable laws and regulations.

Firms covered under this compliance program include the following: all licensed manufacturers of vaccines and related biological drug products, including source material manufacturers and licensed bulk manufacturers; all licensed manufacturers of allergenic products (allergenic patch test manufacturers are not included); unlicensed source material suppliers; all licensed manufacturers of fractionated products, certain recombinant products, and certain human cell, tissue, and cellular and tissue-based products (HCT/Ps) regulated as drugs, and/or biological products.

B. Strategy

This compliance program incorporates a systems-based, risk management approach to conducting inspections, and identifies key systems and three critical elements within each system for inspection.

The key systems are:

1. Quality System
2. Facilities and Equipment System
3. Materials System
4. Production System
5. Packaging and Labeling System
6. Laboratory Control System
7. Donor Eligibility System (only for certain HCT/Ps regulated as drugs (e.g., minimally manipulated, unrelated allogeneic placental/umbilical cord blood products, also known as hematopoietic progenitor cells, cord (HPC-C))

The three critical elements are:

1. Standard Operating Procedures (SOPs)
2. Training
3. Records

The inspection of biological drug manufacturers is conducted under either a Level I (Full) or Level II (Abbreviated) inspection option. This compliance program directs an in-depth audit of the critical elements in each key system, which may affect the safety, purity, potency, identity, and effectiveness of the biological drug, if procedures are not performed properly or the system controls are either inadequate or not functioning correctly.

- A Level I inspection is an in-depth audit of the three critical elements in at least four of the key systems, one of which must be the Quality System, and provides a comprehensive evaluation of the establishment's compliance with CGMPs. In addition to the audit of the Quality System:
 - Level I inspections of HPC-C manufacturers should also include an audit of the Production System and Donor Eligibility System.
 - Level I inspections of all other biological drug product manufacturers should also include an audit of the Production System
- A Level II inspection is a streamlined evaluation of an establishment's compliance with CGMPs. This option provides coverage of the three critical elements in one mandatory key system (Quality System), plus at least one additional key system on a rotating basis during successive biennial inspections.

(See Part III, Inspections, for selection criteria for Level I and Level II inspections.)

C. Program Management Instructions**1. Precautionary Measures/Personal Safety Issues**

Due to the nature of the materials used to manufacture certain biological drug products, investigators may be required to provide proof of inoculation against a particular disease agent or undergo certain medical evaluations prior to beginning an inspection. Investigators should be aware of any such requirements and ensure they are met in sufficient time prior to the start of the inspection, so as to make certain the inspection schedule will not be disrupted.

Additionally, in many cases, the active materials used to manufacture biological drug products are potentially hazardous to the health in their initial form. For this reason, investigators must exercise extreme care when performing inspections of manufacturing areas to ensure they do not come into direct contact with these materials and maintaining universal precautions.

2. Frequency of CGMP Inspections

CGMP inspections are statutory obligations that are routinely conducted on a biennial schedule; however, inspections may be conducted more often if circumstances, such as the firm's compliance history, so warrant.

Exceptions:

This inspectional frequency does not apply to firms that meet the following conditions; additionally, these firms must be inspected using the Level I Inspection Option.

- Firms under a Consent Decree of Permanent Injunction, which have varied inspection schedules set by either the consent decree and/or a consent decree working committee
- Firms under Notice of Intent to Revoke and/or other administrative actions
- Compliance follow-up inspections to verify a firm's implementation of corrective action after a regulatory action has been taken
- A newly licensed or registered facility

3. Scheduling of Inspections and Assignment of Investigators

Under Team Biologics, the Team Biologics (TB) Supervisor (or designee) works with CBER/OCBQ/DIS to develop the workplan schedule of inspections, and to ensure CBER product specialist participation, either on-site or by consult, in CGMP inspections. All parties attempt to minimize rescheduling of inspections, but changes are at times necessary. The TB Supervisor promptly notifies and consults with CBER regarding schedule changes.

After reviewing the establishment's inspectional history and other relevant information, biological drug product manufacturers will be scheduled for either a Level I or Level II inspection.

The inspections will be conducted using a team approach with a Team Biologics investigator leading, and a CBER product specialist participating. The inspection team may include other ORA or CBER members, as necessary, to ensure appropriate coverage of the facility being inspected. If CBER on-site participation is not possible, the Team member(s) alone will conduct the inspection with participation of product specialist off-site (e.g., telephone).

Other inspections:

CBER is responsible for the conduct of all PLI and PAI inspections of CBER-regulated biological drug products. These inspections are part of the review of a BLA or supplement. CBER identifies the scope and content of the inspection and invites ORA to participate in the inspections. CBER/OCBQ, Division of Manufacturing and Product Quality (DMPQ) will notify the district office and the TB Supervisor of all pending pre-license or pre-approval inspections.

PART III - INSPECTIONAL

A. INSPECTIONAL PROCEDURES

Review and use the applicable sections of Chapter 5 of the Investigations Operations Manual (IOM); Compliance Program 7356.002, Drug Manufacturing Inspections; 7356.002A, Sterile Drug Process Inspections; guidance applicable to the manufacture of CBER regulated biological drug products, and other pertinent documents provided by CBER. If there are differences between the above referenced documents and the instructions in this program, investigators should follow the instructions in this program when conducting inspections.

Source material suppliers for vaccine, allergenic, and fractionated products are subject to the requirements in 21 CFR Parts 600-680. Source material suppliers for HPC-C products are subject to 21 CFR Part 1271. Because they are not finished product manufacturers, the drug CGMP regulations in Parts 210 and 211 may not be directly applicable. However, they are required to comply with CGMPs in the context of section 501(a)(2)(B) of the Act, to ensure the products have the quality, purity, and identity they purport. If there are questions regarding the appropriateness of one or more particular inspectional observations relating to a source material supplier, such as suppliers of animal source materials for animal derived products, e.g., antitoxin and porcine Factor VIII, the Team Biologics CO should review the observation(s) before inclusion on the Form FDA 483, Inspectional Observations.

If it is necessary to verify the content of a license application or supplement or if there is an apparent conflict between the approved license and any FDA guidance documents or regulations, contact CBER/OCBQ/DIS, and the relevant product office for assistance.

The Team Biologics lead investigator with the inspection team members, product specialist(s), CBER/OCBQ/DIS and the home district, if applicable, will develop the overall inspectional approach for individual CGMP inspections. Products needing special coverage will be addressed as part of the specific inspectional approach. A similar approach is applied to CBER PLIs and PAIs with CBER/OCBQ/DMPQ and the product specialist reviewer for the submission.

B. SYSTEMS DEFINITION

Inspections of biological drug product manufacturers are to be conducted and reported using the systems and organization defined in this compliance program. In addition to the areas of inspectional focus described below for each system, system assessment should include a walk-through of the facilities whenever possible.

1. Quality System

This system assures overall compliance with CGMPs, internal procedures, and adherence to specifications. It includes, but is not limited to the following: the quality control unit (QC) and all of its review and approval duties; such as release of components and in-process materials, change control, reprocessing, batch release, annual record review, validation protocols and reports; all BPD evaluations; complaint handling, and evaluation of returned and salvaged products, including evidence of counterfeit products.

Assessment of the Quality System is two-phased. The first phase is to evaluate whether the QC unit has fulfilled its responsibility to review and approve all procedures related to production, quality control and quality assurance, and to ensure the procedures are adequate for their intended use. This also includes the associated record keeping systems.

Review records related to product recall, product deviations, complaints, out of specification results, rejects, and failure investigations. Verify the firm routinely reviews its records pertinent to the manufacture of lots or units prior to their release or distribution. Examine, report, and track counterfeit imported products, returned and rejected imported products, and complaint files concerning imported products. The second phase is to assess the data collected in order to identify quality problems that may be linked to other systems.

2. Facilities and Equipment System

This system includes the measures and activities that provide an appropriate physical environment, along with the equipment and resources that are used in the production of the biological drug product.

Coverage of this system should include verifying the appropriateness of buildings and facilities, including maintenance; equipment qualifications (installation and operation); equipment calibration and preventative maintenance; cleaning and validation of cleaning processes as appropriate; prevention of contamination and cross contamination; extractable and leachable or other contaminants on product contact equipment causing deterioration or rendering product less suitable for intended use; and utilities that are not intended to be incorporated into the product; such as HVAC, compressed gases, and steam and water systems. Process performance should be evaluated as part of the inspection of the overall process, which is done within the system where the process is employed.

3. Materials System

This system includes the measures and activities to control finished products, such as components, source materials, water or gases that are incorporated into the product, and containers and closures. The audit of this system should include examining the validation of computerized inventory control processes, product storage, distribution controls, records, and detection and prevention of counterfeiting, including counterfeit imported materials. Facilities used in support of this system must be maintained in a clean and orderly manner, and must be of suitable size, construction and location to facilitate adequate cleaning, maintenance and proper operation. The audit of this system should include a determination of significant physical changes, and an evaluation of routine monitoring of the utility systems. Equipment used in support of this system must be maintained in a clean and orderly manner, and located so as to facilitate proper cleaning and maintenance. The audit of this system should include review of procedures and records of calibration and maintenance, verification that the firm is following procedures and that the procedures conform to the manufacturer's recommendations and/or user manuals. In addition, the audit should verify whether equipment has been adequately qualified for its intended use, if necessary, and if any new equipment was added or any modifications to existing equipment were made since the last inspection.

4. Production System

This system includes the measures and activities to control the manufacture of biological drug products, including following and documenting performance of approved manufacturing procedures. Inspection of this system should include, among other things, batch formulation; dosage form production; sterile filtration; aseptic filling; in-process testing; lot release, and process validation.

Review a sampling of records for operations performed. Verify that records are complete and maintained as required, and are related to the history and disposition of all products produced and distributed. All records must be legible and indelible, and must identify the person performing the work, including dates of the various entries; show test results as well as the interpretation of results; show the expiration date assigned to specific products; and be as detailed as necessary to provide a complete history of the work performed.

Facilities used in support of this system must be maintained in a clean and orderly manner, and must be of suitable size, construction and location to facilitate adequate cleaning, maintenance and proper operation. The audit of this system should include a determination of significant physical and/or manufacturing changes, and an evaluation of routine monitoring of the utility systems. Equipment used in support of this system must be maintained in a clean and orderly manner, and located so as to facilitate proper cleaning and maintenance. The audit of this system should include review of procedures and records of calibration and maintenance, verification that the firm is following procedures and that the procedures conform to the manufacturer's recommendations and/or user manuals. In addition, the audit should verify whether equipment has been adequately qualified for its intended use, if necessary, and if any new equipment was added or any modifications to existing equipment were made since the last inspection.

5. Packaging and Labeling System

This system encompasses the measures and activities that control packaging and labeling of biological drug products. Inspectional coverage should include review of the firm's written procedures regarding packaging and labeling controls, for example, procedures that are in place to prevent label mix-ups, document appropriate label storage, and issuance and destruction of labels after use as well as removal of labels from a manufacturing area. The firm's examination of labels and usage, and label storage and issuance should also be observed during the inspection. Facilities used in support of this system must be maintained in a clean and orderly manner, and must be of suitable size, construction and location to facilitate adequate cleaning, maintenance and proper operation. The audit of this system should include a determination of significant physical and/or manufacturing changes. Equipment used in support of this system must be maintained in a clean and orderly manner, and located so as to facilitate proper cleaning and maintenance. The audit of this system should include review of procedures and records of calibration and maintenance, verification that the firm is following procedures and that the procedures conform to the manufacturer's recommendations and/or user manuals. In addition, the audit should verify whether equipment has been adequately qualified for its intended use, if necessary, and if any new equipment was added or any modifications to existing equipment were made since the last inspection.

6. Laboratory Control System

This system includes all the various measures and activities that are related to laboratory procedures; analytical methods development; validation or verification; and the stability

program. An in-depth audit of this system should include review of the firm's SOPs for control of microbiological contamination and environmental monitoring; review of records for source materials, in-process and finished product testing; evaluation of the firm's methods for sampling and testing products for identity, potency, safety, sterility and conformance with final specifications; and review of the firm's test methods to ensure that they have been appropriately validated.

Review a sampling of records for operations performed; verify that records are complete and maintained as required, and are related to the history and disposition of all products produced and distributed. All records must be legible and indelible, and must identify the person performing the work, including dates of the various entries.

Facilities used in support of this system must be maintained in a clean and orderly manner, and must be of suitable size, construction and location to facilitate adequate cleaning, maintenance and proper operation. The audit of this system should include a determination of significant physical and/or manufacturing changes, and an evaluation of routine monitoring of the utility systems. Equipment used in support of this system must be maintained in a clean and orderly manner, and located so as to facilitate proper cleaning and maintenance. The audit of this system should include review of procedures and records of calibration and maintenance, verification that the firm is following procedures and that the procedures conform to the manufacturer's recommendations and/or user manuals, and determination of any new equipment added, or if any modifications to existing equipment were made since the last inspection.

7. Donor Eligibility System

This system includes the measures and controls that are related to determining the eligibility of a donor of allogeneic and family-related allogeneic HCT/P products, including donor screening and testing. Inspectional coverage should include review of the firm's written procedures for all steps performed in screening, testing, and determining donor eligibility. Inspections should include a review of a sampling of records related to the donor eligibility determination, including the name of the responsible person that made the determination, and the results and interpretation of all donor screening and testing for relevant communicable disease agents. Inspectional coverage should include verification that records are complete and maintained as required, and are related to the history and disposition of all biological drug products produced and distributed. All records must be legible and indelible, and must identify the person performing the work, including dates of the various entries; and be as detailed as necessary to provide a complete history of the work performed.

The audit of this system should also assess the firm's procedures for quarantine of biological drug products pending completion of the donor eligibility determination, the identification and storage of products from donors determined to be ineligible, and the labeling and limited use of such products under the provisions of urgent medical need.

C. INSPECTION COVERAGE

For each of the systems defined above, the inspection must include, coverage of the following three critical elements: **(1) procedures, (2) training/personnel, and (3) records**. Actual observations of the processes applicable to each system should be performed whenever possible. Because most biological drug products covered by this program are aseptically processed,

inspectional guidance for coverage of facilities, equipment calibration, and equipment maintenance has been incorporated into the systems, as appropriate.

1. Standard Operating Procedures (SOPs)

For each of the systems the firm should have approved written procedures and associated records, e.g., testing, maintenance, cleaning, etc., that document adherence to the procedures. Investigators should verify through actual observation, whenever possible, whether or not the firm adheres to the approved written procedures.

- Determine if the SOPs include all steps to be followed in the processing, testing, labeling, and distribution of biological drug products.
- Verify the most current version of approved SOPs is readily available for use by key personnel in the areas where the procedures are performed.

2. Training/Personnel

The organization and personnel, including appropriate qualifications and training employed in any given system, should be evaluated as part of that system's operation.

- Determine if the firm has an adequate number of trained personnel, including supervisors, for all assigned functions and operations, for each of the systems.
- Verify that all personnel responsible for supervising, processing, testing, packing, and distribution of biological drug products have the appropriate educational background, training and experience, including professional training as necessary, or any combination thereof, to perform their assigned functions. Training should also include CGMP regulations, as necessary; to ensure the final product has the safety, purity, potency, identity and effectiveness it purports or is represented to possess.
- If review of the facility's discrepancy reports reveals recurring problems associated with one or more particular employees, review the relevant training records.

3. Records

Records must be maintained concurrently with the performance of each significant step in the processing, testing, and distribution of biological drug products so all steps can be clearly traced and documented. If any records, which are required by regulation, are maintained in an electronic format in place of paper format, the record keeping system should comply with 21 CFR Part 11 (see Guidance for Industry, Part 11, Electronic Records; Electronic Signatures – Scope and Application, August 2003).

- All records must be legible and indelible, and must identify the person performing the work, including dates of the various entries; show test results as well as the interpretation of results; show the expiration date assigned to specific products; and be as detailed as necessary to provide a complete history of the work performed.
- Review a sampling of records for operations performed in each system, verify that records are complete and maintained as required, and are related to the history and disposition of all products produced and distributed. Verify that the firm routinely reviews records pertinent to the manufacture of lots or units prior to their release or distribution.
- Review records related to product recall, product deviations, complaints, out of specification results, rejects, and failure investigations.

D. INSPECTION APPROACHES

This compliance program provides two surveillance inspection options, Level I, and Level II; both the Level I and Level II option satisfy the biennial inspection requirement.

Level I (Full) Inspection Option

The Level I (Full) option is a surveillance or compliance inspection that is meant to provide a comprehensive evaluation of the establishment's overall compliance with applicable CGMP requirements.

Level I inspections apply to one or more of the following conditions:

- Initial GMP inspection of a firm
- Firms that have a history of compliance problems
- Compliance follow-up inspections
- Firms under a Consent Decree of Permanent Injunction
- Firms under Notice of Intent to Revoke and/or other administrative actions
- A firm that has implemented significant changes since the prior inspection
- After conducting two previous inspections under a Level II option

The Level I option includes an in-depth audit of the three critical elements in at least four of the systems, one of which must be the Quality System. In addition to the audit of the Quality System, Level I inspections of biological drug product manufacturers should also include an audit of the Production System, except for manufacturers of HPC-C, where Level I inspections should also include an audit of the Production System and Donor Eligibility System.

If investigators observe serious deficiencies in one or more systems during the course of a Level I inspection, they may, after consult with an ORA/OE Compliance Officer, revert to the Level II inspection option, provided a minimum of two systems are completed. The consultation should also include discussion of the necessary documentation to support a possible enforcement action.

Level II (Abbreviated) Inspection Option

The Level II (Abbreviated) option is a focused surveillance CGMP inspection that covers **two** of the key systems, and provides verification of an establishment's continued compliance with CGMP. This option also includes inspectional coverage of any significant changes to the facilities, manufacturing process, equipment, or other license supplements since the preceding inspection.

The Level II option includes an in-depth audit of the three critical elements of the **Quality System**, and **one additional** system must be selected for coverage during the inspection, which will be determined during work planning. Coverage of additional systems should be rotated in successive Level II inspections, unless otherwise indicated by issues identified during the current or previous inspection. In addition, during the course of a Level II inspection, verification of QA activities may require limited coverage of other systems.

Select a Level II Option for any one of the following situations*:

- The establishment has a satisfactory history of compliance, e.g., at least two successive NAI or VAI inspections
- One of the two previous biennial inspections was a Level I inspection. Note: A comprehensive inspection performed under the previous, non-systems based inspection programs can be considered a Level I inspection.
- The inspection preparation procedures revealed no specific trends that may have a significant impact on product safety or quality identified during inspection preparation (review of BPDs, product recalls, etc.).

* Until further notice the Level II inspection option should not be utilized for HPC-C establishments.

E. INSPECTIONAL GUIDANCE

1. **Cooperative Manufacturing Arrangements:** for further guidance, see: [Guidance for Industry: Cooperative Manufacturing Arrangements for Licensed Biologics](#)

i. SHARED MANUFACTURING

In a shared manufacturing arrangement, each manufacturer is licensed to perform part of the manufacturing of a product, but no one manufacturer is licensed for the entire process. Each manufacturer in a shared arrangement submits a separate license application, and the approval of the product is based on information from each application.

The manufacturer who prepares the product in its final form will be held responsible for any post-approval obligations, such as reporting biological product deviations and adverse events, unless the manufacturers agree and the approved application says otherwise. Investigators should determine if the agreements in the applications are being met, particularly as they pertain to the integrity of the product.

ii. DIVIDED MANUFACTURING

In a divided manufacturing arrangement, each manufacturer is licensed to manufacture a product in its entirety, but each performs only part of the process. This arrangement is described in supplements submitted to each manufacturer's license. The record requirements for divided manufacturing arrangements are described in 21 CFR 600.12(e). Each manufacturer must have documentation of its responsibility for manufacturing the product.

The manufacturer who makes the product in final form must retain a complete set of manufacturing records for all operations relating to the product, including those operations performed at another facility. Investigators should thoroughly review the divided manufacturing arrangement and determine if the process; as described in the application supplements, is being followed. Particular attention should be paid to the conditions under which intermediate product is shipped between the facilities, to ensure the integrity of the product.

iii. CONTRACT MANUFACTURING

A license holder is responsible for compliance with product and establishment standards, but may contract out part or all of the manufacturing to another facility. Establishments may hire contractors to perform many manufacturing operations, e.g., testing samples, filling and storing products. Both the manufacturer and contractor share responsibility for product quality; however, the manufacturer remains ultimately responsible. The contractor is responsible for complying with CGMPs, as applicable.

For establishments subject to the CGTP regulations in 21 CFR Part 1271 (e.g., HPC-C manufacturers), before entering into a contract, agreement, or other arrangement with another establishment to perform any step in manufacture, they must ensure that the establishment complies with applicable CGTP requirements. If, during the course of the contract, agreement, or other arrangement, they become aware of information suggesting that the establishment under contract, agreement, or other arrangement may no longer be in compliance with such requirements, reasonable steps must be taken to ensure the establishment complies with those requirements. If it is determined that the establishment under contract, agreement, or other arrangement is not in compliance with those requirements, the contract, agreement, or other arrangement with the establishment must be terminated.

During the inspection, review a copy of the current contract(s) and determine: (1) extent of services provided; (2) each party's responsibility for the product or operations performed; (3) who prepared the SOPs used by the contractor, and (4) who performed product quality control tests. If inspecting a contract manufacturer, verify that the license holder is notified of any manufacturing deviations and any manufacturing changes for its licensed product(s). If inspecting the license holder, who is responsible for final release of the batch, verify that all records created by the contract manufacturer and associated with release of any given batch are available and have been approved.

2. **Change Reporting:** for further guidance see: [Guidance for Industry: Changes to an Approved Application - Biological Products](#)

Requirements that manufacturers notify FDA about all changes in the product, production process, quality controls, equipment, facilities, responsible personnel or labeling, from that in their approved license application are described in 21 CFR 601.12. Determine if process changes made since the approval of the application have been properly reported.

If biological drug products are reprocessed or reworked, they must be reported in a supplement to CBER prior to distribution, unless the reprocessing or reworking was done according to a procedure previously approved by CBER. The type of notification is based on the potential risk of the change having an adverse effect on the identity, strength, quality, purity, or potency of the product as it may relate to the safety or effectiveness of the product.

Changes that have a minimal effect on the safety or effectiveness of a product may be implemented before being reported to CBER; however, manufacturers are required to include such changes in their annual reports to the agency.

Data relevant to changes reported in annual reports (e.g., validation data) must be made available during FDA inspections. When a change has a moderate potential to have an adverse effect on

the identity, strength, quality, purity, or potency of the product as it may relate to the safety or effectiveness of a product, a manufacturer must submit a license supplement describing the change. If FDA does not advise the manufacturer within 30 days of submission of the supplement that the change requires approval prior to distribution of the product (i.e., a Prior Approval Supplement), the manufacturer may distribute product manufactured using the change pending approval of the supplement. These supplements are referred to as CBE-30, or changes being effected in 30 days.

When a change has a substantial potential to adversely affect the identity, strength, quality, purity, or potency of the product as it may relate to the safety or effectiveness of the product being manufactured, which uses that change, cannot be distributed until FDA approves a prior approval supplement (PAS) describing the change.

If the firm has an FDA-approved comparability protocol in place for a particular change or set of changes, the firm may be able to report the change in a lower reporting category that would be set forth in the approved comparability protocol supplement, if it follows the protocol when implementing the change.

For example, if a change would normally be reported as a prior approval supplement, the firm could report it in a CBE-30 supplement, if they have an approved comparability protocol for that change that sets forth a reduced reporting category, and the protocol was followed when making and evaluating the change.

When evaluating changes to an approved application:

- Request a complete list of changes or modifications made to products, processes, quality control, equipment, facilities, systems, and/or responsible personnel that have not been submitted to CBER as either a supplement or in an annual report since the last inspection; include it as an exhibit in the report.
- Review any changes for which the manufacturer determined a supplement is not required, and that have not been included in an annual report to CBER.
- Determine if changes have been validated, when appropriate. If there is any question as to whether or not a change should have been reported or whether a change should have been submitted in a supplement instead of an annual report, contact OCBQ/DIS, or the appropriate product office.

Note: Manufacturer's annual reports are submitted based on the specific product approval date, indicated in 21 CFR 601.12(d). Therefore, the annual reporting time varies for any given product or company.

3. Components:

Manufacturers who purchase components from outside sources are required to establish adequate specifications for such components. The licensed manufacturer is ultimately responsible for ensuring that components it uses conform to specifications and are acceptable for use. This may be done through inspections, sampling and testing, and/or through certificates of analysis from the supplier. The manufacturer should establish the validity of the certificates through experience, historical data, testing, and/or audits of the supplier.

For components received from outside sources, either purchased or otherwise received, verify that: (1) the firm has written, approved specifications for the component(s); (2) the firm evaluates and selects suppliers based on their ability to meet specified requirements, and (3) the type and extent of control needed over the component and suppliers has been defined and is based on the manufacturer's evaluation of the supplier.

Animal source material must meet the applicable requirements of 21 CFR 600.11. Investigators should determine if tests and specifications for materials of animal source that may potentially be contaminated with adventitious agents (e.g., mycoplasma, Bovine Spongiform Encephalopathy for bovine-derived products, and others) are performed as described in the license application.

Acceptance activities must be documented. Verify that the manufacturer has defined methods, e.g., inspections, tests, and other verification tools (certificates of analysis and/or supplier audits), to ensure that components conform to all specifications prior to release for use in manufacturing and that acceptance activities are documented in the batch record. Review the manufacturing SOPs and batch records for a representative number of lots to ensure that acceptance criteria are met for all components.

- Media/Buffers

The firm should have well-established acceptance criteria for all materials. If buffers or media are prepared prior to use, determine if the firm has established and validated holding times and conditions, and has records to show the conditions are met.

- Containers/Closures

Determine if the firm has adequate written specifications and procedures describing the receipt, handling, sampling, and storage of containers and closures, especially those that need to be sterile and/or pyrogen-free. Container closures should be made from material that will not hasten the deterioration of the product and should be free of surface contaminants and leachables.

4. Validation:

- Process

Validation data for the manufacturing process are generally reviewed during application review, as are the validation data to support changes that are reported in prior approval supplements. Determine if any changes in the process made since the approval of the application, for which a supplement is not required, have been validated in accordance with a protocol, and that the validation process is adequately documented.

- Computer

If the firm uses computer systems to control any part of the process, determine if the software for computers and automated data processing systems are validated. If the firm is using a computerized record-keeping system, ensure the integrity of records is maintained. The systems should be such that records cannot be overwritten to disguise failing results. Document any computer systems the firm uses for control of the manufacturing process.

- *Shipping*

Determine if shipping conditions have been validated, including containers and methods. If the firm has contract manufacturers that perform some or all of the manufacturing steps, verify that shipping conditions for the partially processed materials have been validated, and the validated processes are followed and documented. The shipper must verify the product is maintained at the proper temperature during shipment, and must have records to demonstrate this.

5. Lot Release:

Per 21 CFR 610.2(a), a manufacturer may be required to send samples of any lot of any licensed biological product, together with protocols showing results of applicable tests to CBER. It further states that upon notification by the Director, CBER, a manufacturer shall not distribute a lot of a product until the Director releases it.

Some manufacturers of well-established biological drug products have, through approved license supplements; been granted the alternative to lot release and are on a "Surveillance" program. Manufacturers on surveillance are still required to submit samples and/or protocols to CBER at specified intervals, but they may distribute the applicable products without receiving prior CBER lot release. Such manufacturers must still complete their own internal lot release process whether on CBER lot release or on a surveillance program.

The Director, CBER, at any time, including as a result of compliance history or regulatory actions, may remove a product from surveillance and return it to CBER lot release.

Review representative lot release test records to verify all specifications have been met. Compare raw test data against test results provided in protocols submitted to CBER to determine if they correlate. Check whether any lot has failed to be released, and if so, the reason for the failure and the disposition of all failed lots.

6. Biologic Product Deviations (BPDs): for further guidance see: [Biological Product Deviation Guidances & Rules](#)

Under 21 CFR 600.14, a manufacturer must report any event associated with the manufacturing, including testing, processing, packing, labeling, or storage, or with the holding or distribution of a licensed biological product, which may affect the safety, purity, or potency of a **distributed** licensed product.

BPDs are required to be reported to the CBER/OCBQ/DIS as soon as possible, but no later than 45 calendar days from the date of discovery of information reasonably suggesting a reportable event has occurred. Under 21 CFR 600.14, the manufacturer who holds the biologics license and who had **control** over the product when the deviation or unexpected event occurred must report a BPD.

If a manufacturer contracts out any manufacturing step, that manufacturing step is performed under the manufacturer's control under the regulation. Thus, under 21 CFR 600.14(a), the manufacturer must establish a procedure for receiving information from that contract manufacturing facility on all deviations, complaints, and adverse events that may affect the product.

A *contract manufacturer* (i.e., performs, under contract, a step in manufacturing for another facility) must conduct manufacturing in accordance with all applicable regulations.

CBER provides ORA with direct access to BPD information through CEARS (CBER Error and Accident Reporting System). CEARS only captures the reportable events. Instructions for accessing the system are found on the CEARS intranet web page.

To facilitate industry reporting of BPD, CBER developed a standardized reporting format (FDA Form 3486) with both hard copy and electronic reporting. CBER encourages electronic reporting.

Prior to conducting an inspection, investigators should review the manufacturer's BPD submissions in CEARS. An assessment of the deviation codes may assist you in determining the optional system to inspect. Otherwise, select a representative sample of reports to verify the adequacy of the firm's corrective action.

- Evaluate both reportable deviations and non-reportable incidents or problem reports and verify the adequacy of any corrective action implemented by the manufacturer.
- Determine if the manufacturer filed all reportable biological product deviations.

It is FDA policy to only cite on a Form FDA-483 a deficiency associated with a previously-reported BPD if the establishment's investigation or corrective action was inadequate.

7. Reporting of Adverse Experiences:

Under 21 CFR 600.80, any life-threatening adverse experience, serious adverse experience, and unexpected adverse experience associated with the use of a biological product in humans, whether or not considered product related, must be reported by the manufacturer to CBER as soon as possible and no later than 15 days of initial receipt of information, and periodically, depending on the seriousness of the adverse reaction. Manufacturers of blood products, including plasma derivatives, are required to submit monthly reports for adverse experiences involving transmission of infectious diseases. Review records of adverse events received by the manufacturer, and determine if reports have been submitted to CBER as required. Contact OCBQ/DIS if there are questions or concerns regarding the reportability of an adverse experience.

F. REPORTING

Note: If, at any time during the inspection, it is determined that a potentially serious health hazard exists, investigators and compliance officers should contact CBER's OCBQ/DCM immediately.

1. Record any deviation from 21 CFR Parts 210-211, Parts 600-680, or Part 1271, including failure to adhere to license and supplement requirements, on the FDA 483. Per the IOM, conditions listed on the FDA 483 should be **significant**, and should **relate** to an observed or potential problem with the facility, equipment, processes, controls, products, employee practices or records.

"Potential problems" should have a reasonable likelihood of occurring based upon observed conditions, records or events. Do not cite on the FDA 483 deviations from draft or proposed regulations or from guidance documents. Present verifiable evidence for conclusions of observed non-compliance with CGMPs. Investigators should not use the term "inadequate" without explaining why or how it is inadequate. Refer to policy in the IOM, Chapter 5, Section 5.2.3.14 and Field Management Directive 120 for further guidance on the content of Inspectional Observations.

The most critical observations should be listed first. Deficiencies that were noted during a previous inspection and remain uncorrected should be included on the FDA 483 as repeat deficiencies. Discuss with manufacturer prior observed deficiencies that have gone uncorrected.

If necessary, contact the ORA/OE CO to discuss and resolve questions relating to the possible inclusion of observations on the FDA 483. Good judgment is necessary when deciding whether conditions are objectionable in view of their relation to other conditions or controls at the given time and place. When there is continued uncertainty about the significance of one or more observations, they should not be listed on the FDA 483. They should, however, be discussed with the firm's management, and reported in the EIR.

2. Report briefly on all systems covered as outlined in [PART III, INSPECTIONS](#), of this program, regardless of findings. If the inspection is a follow-up to a violative inspection, report on the implementation of the firm's promised corrective actions.
3. Examine, report, and track counterfeit imported products, returned and rejected imported products, and complaint files concerning imported products.
4. The Team Biologics lead investigator will coordinate the preparation of the report. The report will be endorsed and classified by the investigator. The ORA/OE CO will have the initial responsibility to review OAI reports, and will decide which reports should be presented to CBER/OCBQ for regulatory action consideration. The ORA/OE CO has the authority to independently re-classify an inspection conclusion from OAI to VAI or NAI. For those reports sent to CBER/OCBQ for regulatory action consideration, CBER/OCBQ's Division of Case Management (DCM) will make the final classification determination. Reports should be submitted within established agency time frames.

PART IV – ANALYTICAL

NO FIELD ANALYSES ARE PLANNED UNDER THIS PROGRAM.

The routine collection and analysis of physical samples is not envisioned under this program. If CBER requests sample collection, specific instructions will be provided. Consult with CBER program contacts identified in [Part VI](#), **before** collecting samples for agency analysis, except for documentary samples for interstate commerce (collect a documentary sample in accordance with IOM 4.4.6.2.1 to support regulatory/administrative action).

Contact the CBER Sample Custodian (**301-594-6517**) before shipping any samples to CBER. No one is available to receive samples over the weekend. All samples collected under this program will be shipped to:

Center for Biologics Evaluation and Research
Attention: Sample Custodian, HFM-672
5516 Nicholson Lane, Building B, Room 113
Kensington, MD 20895

Collect any samples of a potentially bio-hazardous nature in accordance with IOM 1.5.

Original results of analyses will be forwarded to the ORA/OE CO, with a copy to the home district of the involved facility. Investigators should document in FACTS to whom CBER should send the sample results. If unable to document in FACTS, then use Form FDA 464a, C/R Continuation Sheet.

Copies of collection reports for physical samples must be submitted to CBER/OCBQ/DCM, HFM-610.

PART V - REGULATORY/ADMINISTRATIVE STRATEGY

The evaluation of inspection findings and any resultant recommendation for enforcement action will be conducted in accordance with existing procedures and the RPM. The Team Biologics lead investigator will ensure the home district will be advised of inspectional and compliance activities related to facilities located within the district.

The decision on the type of action to recommend should be based on the seriousness of the documented deficiencies, and the most effective way to protect the public health. Because the number of manufacturers of biological drug products (vaccines, allergens, etc.) is often small, medical need and relative availability of the product(s), as well as the potential adverse effect of the CGMP deficiencies on the finished product(s) should be considered when determining the appropriate advisory, administrative or judicial action.

A firm's written corrective action, in response to the FDA 483, **should not** preclude the consideration of an advisory, administrative, or judicial action. If the objectionable observations represent a continuing pattern of non-compliance, a failure to correct significant deficiencies noted during a previous inspection, or the deficiencies pose a serious threat to the public health, and voluntary action is either not appropriate or can not be readily accomplished, the appropriate advisory, administrative, or judicial action should be recommended.

State of Control

A firm is considered to be operating in a **state-of-control** when it employs conditions and practices that ensure compliance with the intent of Section 501(a)(2)(B) of the Act, and the portions of the CGMP regulations that pertain to their systems. A firm in a state of control produces finished biological drug products for which there is an adequate level of assurance of quality, strength, identity, purity, and potency.

Well-documented CGMP deficiencies provide the evidence for concluding that a firm is not operating in a state of control. Evidence of serious deficiencies within a system could constitute overall failure of that system, and the firm to be considered **not** in a **state-of-control**. When the inspectional findings demonstrate that a firm is not operating in a state of control, and/or the establishment's management is either unwilling or unable to implement full corrections in a timely manner, administrative or judicial action should be considered.

Regulatory recommendations should be based on serious deficiencies that are well documented with supporting evidence. The quality of any action begins with the quality of evidence collected at the time of the inspection, to support the observed objectionable conditions. The recognition, collection, and effective presentation of evidence are essential to any successful advisory, administrative, or judicial action. Establish individual responsibility, and identify persons to hold accountable for violations and with whom the agency should communicate to seek lasting corrections, and/or to be the subject of enforcement actions.

Refer to the RPM to determine the appropriate advisory, administrative or judicial action based on the inspectional findings. Early consultation with CBER/OCBQ/DCM is critical when immediate action is indicated, e.g., license suspension, a temporary restraining order (TRO), etc. [See RPM Chapter 6](#) regarding an injunction to protect the public health.

When inspectional findings indicate the potential for fraud, e.g., falsification, counterfeiting, illegal importation, and/or drug diversion, the investigator should notify the Team Biologics Compliance Officer, the Team Biologics Supervisor, and OCBQ/DCM (HFM-610), who will alert the appropriate OCI office. The investigator should continue to pursue any public health concerns, in coordination with CBER/OCBQ, concurrently.

An initial decision on the type of action to recommend should be consistent with the RPM and be based on the seriousness and frequency of the deficiencies as well as the firm’s overall compliance history. For example, classify an inspection report that documents one or more systems **not** in a **state-of-control** as OAI, and consider recommending a Warning Letter or taking other appropriate action.

For a licensed biologic, the advisory, administrative, and judicial options available include:

Action	Among other things, consider if,
Warning Letter:	Violations of regulatory significance that cause one or more systems to be considered not in a state-of-control.
License Revocation (21 CFR 601.5)	<p><u>Notice of Intent to Revoke with Opportunity for Correction:</u> Unable to gain access to the manufacturing facility for inspection Licensed products are not safe or effective for their intended use, or are misbranded with respect to any such use. Manufacturer fails to report a change in accordance with 21 CFR 601.12 Manufacturer fails to conform to applicable standards to ensure product safety, potency and purity Licensed products are no longer manufactured</p> <p><u>Direct Revocation without Opportunity for Correction:</u> Demonstration of willful disregard in addition to above.</p>
License Suspension (21 CFR 601.6)	Reasonable grounds for revocation and a danger to health exist. It provides immediate withdrawal of the authorization to ship a biological product in interstate commerce.
Seizure	Manufacturer is unwilling or unable to retrieve violative products, or products held for sale are unsuitable for safe use. U.S. Marshal takes possession of products through Court Order pursuant to Section 304 of the Federal Food, Drug, and Cosmetic Act.
Injunction	A current health hazard exists, the establishment has a history of uncorrected violations despite previous warnings, suspension of the firm’s license would result in an unacceptable shortage of products, and/or to halt intrastate distribution of products manufactured under violative conditions
Prosecution	Fraud, gross, flagrant or intentional violations, health hazards, or serious violations that have not been corrected.

Deficiencies

The investigator should verify through actual observation, whenever possible, whether or not the firm adheres to the applicable regulations and the law. The following, although not all-inclusive, are examples of deficiencies that may be indicative of the firm’s **state-of-control**.

Inspectional findings that demonstrate a firm is not operating in a state-of-control may be used as evidence for taking appropriate advisory, administrative, or judicial actions.

Examples of deficiencies are arranged by System. Any deficiency listed in one system may be applicable to other systems. For example, deficiencies pertaining to the training and qualification of employees, or deficiencies involving discrepancy and failure investigations, are listed only under the Quality System. However, both deficiencies could be applicable to multiple systems. In addition, while the CGMP regulations apply to the manufacture of biological drug products, the same CGMP principles apply for the manufacture of biological intermediates and drug substances under Section 501(a)(2)(b) of the FD&C Act, and the Biologics regulations under 21 CFR Part 600.

Quality System

Firms must have an effective quality assurance program, and should not rely solely on finished product testing to ensure products meet their specifications. The responsibilities and functions of the quality control unit must be clearly defined. QA is not limited to processing and finished products, but incorporates all the major systems, e.g., components and in-process materials, facilities and equipment, complaint handling, failure investigation, and change control.

● Training/qualification of employees

- *Employees [are/were] not trained in the particular operation that they performed and/or in CGMPs related to their job functions. 211.25(a)*
- *Individuals engaged in the manufacture, processing, and packing of products [do/did] not have education, training, and experience, or any combination thereof, to enable them to perform assigned functions. 211.25(b), 600.10(b)*
- *There [are/were] not an adequate number of qualified personnel to perform and supervise the manufacture, processing, packing, or holding of each product. 211.25(c)*

● Product reviews/audits by the quality control unit, at least annually

- *The quality control unit [fails(ed)] to review production records to assure that no errors has occurred, or if errors have occurred that they are fully investigated. 211.22(a)*
- *The quality control unit [fails(ed)] to conduct and/or document an annual review of production records so that data therein can be used for evaluating the quality standards of each product to determine the need for changes in product specifications, manufacturing and/or control procedures. 211.180(e)*
- *Written procedures for production and process control [are/were] not drafted, reviewed and approved by the appropriate organizational units and/or the quality control unit. 211.100(a)*
- *Periodic quality audits of activities related to core CGTP requirements [are/were] not performed. 1271.160(c)*

● Complaint reviews; documented, evaluated, and investigated including corrective action and follow-up where appropriate

- *Written procedures [are/were] not established and/or followed for the annual review and evaluation of complaints and investigations. 211.180(e)(2)*
- *Written procedures [fail(ed)] to include provisions for review by the quality control unit of complaints involving the possible failure of the product to meet any of its specifications and, a determination as to the need for an investigation. 211.198(a)*
- *The compliant investigation [does/did] not include documentation of the findings and/or follow-up. 211.198(b)(2)*

- **Discrepancy and failure investigations related to manufacturing and testing; documented, evaluated, and thoroughly investigated, including corrective actions and follow-up where appropriate**
 - *Failure to conduct investigations into unexplained discrepancies or*
 - *The failure of a batch or any of its components to meet specifications whether or not the batch was distributed.*
 - *[Are/were] not always documented*
 - *[Do/did] not always include the conclusions and/or follow-up*
 - *[Do/did] not always extend to other batches of the product*
 - *[Do/did] not always extend to other products with the associated discrepancies 211.192*
- **Adherence to an adequate Out of Specification (OOS) procedure**
 - *Deviations from the written procedures [are/were] not recorded and/or justified. 211.160(a)*
 - *Failure to conduct investigations into unexplained discrepancies or the failure of a batch or any of its components to meet specifications: 211.192*
- **Change control procedures; documented, evaluated, approved, and the need for revalidation assessed by the quality control unit.**
 - *The quality control unit [fails(ed)] to:*
 - *Approve or reject all procedures and/or specifications impacting on the identity, strength, quality, and purity of the products. 211.22(c)*
 - *Draft, review, and/or approve written procedures, including any changes. 211.100(a)*
 - *Conduct and/or document an annual review of production records. 211.180(e)*
- **Reprocessing and/or reworking procedures; evaluated, reviewed and approved by the quality control unit, and the impact on validation and stability evaluated**
 - *Written procedures [are/were] not established and/or followed for reprocessing batches of products, and [do/did] not include the steps to be taken to assure that the reprocessed batches conform to all established standards, specifications, and characteristics. 211.115(a)*
 - *Reprocessing procedures [are/were] not performed with the review and approval of the quality control unit. 211.115(b), 601.12*
- **Returned and salvaged product; assessment and investigation conducted and expanded where warranted, including disposition**
 - *Written procedures [are/were] not established to assure that the responsible officials of the firm are made aware of returned and/or salvaged product, and are notified in writing of any investigations conducted. 211.180(f)*
- **Product rejects investigated with corrective action where appropriate**
 - *Failure to establish and/or follow written procedures for the receipt, identification, storage, handling, sampling, testing; and approval or rejection of components and product containers and closures. 211.80(a)*
 - *Products that [fail(ed)] to meet established standards or specifications and any other relevant quality control criteria [are/were] not rejected. 211.165(f)*
 - *Failure to conduct investigations into unexplained discrepancies or the failure of a batch or any of its components to meet specifications. 211.192*
- **Stability failures; investigation**
 - *Failure to conduct investigations into unexplained discrepancies and/or the failure of a batch or any of its components to meet specifications. 211.192*
 - *The quality control unit [fails(ed)] to review production records to assure that no errors have occurred or, if errors have occurred, that they have been fully investigated. 211.22(a)*

- **Quarantine products**
 - *Failure to:*
 - *Ensure that rejected components, product containers, and closures [are/were] identified and controlled under a quarantine system to prevent their use in manufacturing or processing operations for which they are unsuitable. 211.89*
 - *Establish and/or follow written procedures that describe the warehousing of products, including quarantine before release. 211.42(a)*
 - *Ship in quarantine HCT/Ps shipped as pre-distribution shipments [within the establishment] [between establishments] which [do/did] not meet the criteria for being available for distribution. 1271.265(b)*
- **Finished product distribution records by lot**
 - *Failure to establish and/or implement a system by which the distribution of each lot of product could be readily determined to facilitate its recall if necessary. 211.150(b)*
 - *Distribution records [do/did] not contain the name and strength of the product and description of the dosage form. 211.196*
- **Adverse Experience Reporting (AER)**
 - *AERs [are/were] not submitted to CBER, and/or reviewed as required. 21 CFR 600.80*
- **Licensing**
 - *Significant manufacturing changes [are/were] not reported and [are/were] implemented, and product [is/was] distributed prior to obtaining the required CBER approval. 601.12(b)*
 - *Product [is/was] not manufactured as described in the approved license application. 601.2(d)*

NOTE: Consult with CBER/DIS before including observations on the Form FDA 483, or in an enforcement action recommendation, that are related to non-conformity with commitments made in the Biologics License Application.

- **Reporting of Biological Product Deviations (BPDs)**
 - *Reportable BPDs [are/were] not submitted to CBER, or [are/were] not submitted within the required timeframe. 600.14*
- **Manufacturing Arrangements**
 - *Failure to ensure that establishment(s) that by contract, agreement or arrangement, perform manufacturing steps [are/were] in compliance with:*
 - applicable CGTP requirements prior to the initiation of the contract, agreement of arrangement*
 - applicable CGTP requirements after information became available that suggested the establishment was no longer in compliance. 1271.150(c)(1)(iii)*
 - *The contract, agreement or arrangement of an establishment to perform manufacturing steps [is/was] not terminated after it was determined that the establishment was not in compliance with the applicable CGTP requirements. 1271.150(c)(1)(iii)*
 - *The [name and address] [list of responsibilities] of establishment(s) that perform manufacturing steps for you [is/was][not maintained] [not made available to FDA during an inspection]. 1271.270(e)*
- **Exemptions and Alternatives**
 - *Operations different than those required by the applicable requirements, and for which an exemption or alternative was requested, began prior to the date that the exemption or alternative [is/was] granted. 1271.155(e)*
 - *Failure to maintain records of FDA's grant of the exemption or alternative/the date operations began under the terms of the exemption or alternative. 1271.155(f)*

Facilities and Equipment System

Deficiencies in this system may include violative conditions relating to the design, maintenance and cleaning of the facility and equipment, including but not limited to air handling and water systems, lighting, and sanitation.

FACILITIES:

- **Maintenance**

- *Buildings used in the manufacture, processing, packing, or holding of products [are/were] not maintained in a state of good repair. 211.58*

- **Facility design and air handling systems for prevention of cross-contamination (e.g., cytotoxics, live virus, spore forming organisms)**

- *Building(s) used in the manufacture, processing, packing, or holding of a product [are/were] not of suitable size, construction and/or location to facilitate cleaning, maintenance, and proper operations. 211.42(a)*
- *Operations [are/were] not performed within specifically defined areas of adequate size. 211.42(c)*
- *Floors, walls, and ceilings of aseptic processing areas are not smooth, hard surfaces that are easily cleanable. 211.42(c)(10)*

- **General air handling systems**

- *Adequate ventilation [is/was] not provided. 211.46(a)*
- *Equipment for adequate control over air pressure, microorganisms, dust, humidity, and temperature [are/were] not provided. 211.46(b), 600.11(a)*
- *Air filtration systems, [are/were] not used, when appropriate, on air supplies to production areas. 211.46(c)*

- **Specifically designed area for the manufacturing operations performed by the firm to prevent contamination or mix-ups**

- *Buildings [do/did] not have adequate space for the orderly placement of equipment and materials to prevent mix-ups and/or contamination between different components, product containers, closures, labeling, in-process materials, and/or products. 211.42(b)*
- *There [are/were] not separate or defined areas or other control systems for the firm's operations as necessary to prevent contamination or mix-ups, including:*
 - *Receipt, identification, storage, and withholding from use of components, product containers, closures, and labeling pending sampling, testing, or examination by the quality control unit before release for manufacturing or packaging*
 - *Holding of rejected, and storage of released components, product containers, closures, and labeling before disposition*
 - *Storage of in-process materials*
 - *Manufacturing and processing operations*
 - *Quarantine storage before release of products*
 - *Control and laboratory operations*
 - *Aseptic processing, including:*
 - *An environmental monitoring system*
 - *A room and equipment cleaning/disinfecting system*
 - *A maintenance system for equipment used to maintain aseptic conditions. 211.42(c)*
 - *Laboratory and bleeding rooms used for the processing of products [are/were] not effectively fly-proofed and kept free of flies and vermin. Rooms [are/were] not constructed as to assure the freedom from dust, smoke, and other deleterious substances and to permit thorough cleaning and disinfection. 600.11(c)*

- **Sanitation of the building, use of rodenticides, fungicides, insecticides, cleaning and sanitizing agents**
 - Buildings used in the manufacture of products [are/were] not:
 - *Maintained in a clean and sanitary condition. 211.56(a)*
 - *Free of infestation by rodents, birds, insects, and other vermin. 211.56(a)*
 - Written sanitation procedures:
 - *[Are/were] not established for the use of suitable rodenticides, insecticides, fungicides, and fumigating agents. 211.56(c)*
 - *[Are/were] not designed to prevent the contamination of equipment, components, product containers, closures, packaging, labeling materials, or products. 211.56(c)*
- **Retention of cleaning and sanitation records**
 - *Records of facility cleaning and sanitation activities [are/were] not retained for three years after creation. 1271.190(d)(2)*

EQUIPMENT:

- **Adequacy of equipment design, size, and location**
 - *Equipment used in the manufacture of the product [is/was] not of appropriate design, adequate size, and/or suitably located for its intended use and/or for its cleaning and maintenance. 211.63*
- **Equipment surfaces should not be reactive, additive, or absorptive**
 - *Equipment is constructed so that surfaces that contact components, in-process materials, or products are reactive, additive, and/or absorptive and may alter the safety, identity, strength, quality, or purity of the product. 211.65(a)*
 - *Surfaces that come in contact with products [are/were] not clean and free of surface solid and leachable contaminants and other materials that will hasten the deterioration of the product or otherwise render it less suitable for the intended use 600.11(b).*
- **Appropriate use of substances required for equipment operations (lubricants, coolants, refrigerants, etc.) contacting products/containers/etc.**
 - *Equipment is constructed so that substances required for operation, such as lubricants or coolants, come into contact with components, product containers, closures, in-process materials, or products and may alter the safety, identity, strength, quality, or purity of the product. 211.65(b)*
- **Equipment cleaning and use logs**
 - *A written record of major equipment cleaning, maintenance, and use [is/was] not included in individual equipment logs that show the date, time, product, and/or lot number of each batch processed. 211.182*
- **Cleaning procedures and cleaning validation**
 - *Written procedures for cleaning and maintenance of equipment, including utensils, used in the manufacture of the product [are/were] not established and/or followed. 211.67(b)*
 - *Equipment and/or utensils [are/were] not cleaned, maintained, and sanitized at appropriate intervals to prevent malfunctions or contamination that would alter the safety, identity, strength, quality, or purity of the product. 211.67(a)*
 - *Records of equipment maintenance, cleaning, sanitizing, and inspection [are/were] not kept. 211.67(c)*
 - *Processing and storage containers, filters, filling apparatus, and other pieces of apparatus and accessory equipment, including pipes and tubing, [are/were] not designed and constructed to permit thorough cleaning and, where possible, inspection for cleanliness 600.11(b)*

- **Equipment qualification, calibration and maintenance, including computer qualification/validation and security**
 - *Equipment [is/was] not routinely calibrated, inspected, or checked according to a written program designed to assure proper performance. Written records of calibration checks and inspections [are/were] not maintained. 211.68(a)*
 - *Appropriate controls [are/were] not exercised over computer or related systems to assure that only authorized personnel institute changes in master production and control records or other records. 211.68(b)*
 - *Input to and output from the computer or related system of formulas or other records or data [are/were] not checked for accuracy. 211.68(b)*
 - *Hard copy or alternative systems, such as duplicates, tapes, or microfilm, designed to assure that backup data are exact and complete and that it is secure from alteration, inadvertent erasures, or loss are not maintained. 211.68(b)*
- **Equipment identification practices (where appropriate)**
 - *Major equipment used during the production [is/was] not properly identified. 211.105(a)*

Materials System

Deficiencies in this system may include violative conditions relating to material handling, including, but not limited to, in-process materials and finished product examination, sampling, testing, quarantine, storage, issuance of materials, including containers and closures, and discrepancy investigation and appropriate follow-up.

- **Identification, Inventory and Storage of components, containers, closures**
 - *Written procedures [are/were] not established, and/or followed for the receipt, identification, storage, handling, sampling, testing, and approval or rejection of components and product containers and closures. 211.80(a)*
 - *Each lot of product containers [is/was] not identified with a distinctive code or status (e.g., quarantined, approved, or rejected). 211.80(d)*
 - *The components, product containers and/or closures [are/were] not handled and/or stored in a manner to prevent contamination. 211.80(b)*
- **Storage under quarantine until tested or examined, and released**
 - *The components, product containers, and/or closures [are/were] not stored under quarantine until they were released. 211.82(b)*
 - *The product containers and/or closures [are/were] not withheld from use, and/or were released for use by the quality control unit before the lots had been sampled and tested by the quality control unit. 211.84(a)*
- **Representative samples collected, tested or examined using appropriate means**
 - *A representative sample of each shipment of each lot of components [is/was] not collected for testing or examination. 211.84(b)*
- **At least one specific identity test is conducted on each lot of each component**
 - *Tests [are/were] not conducted to verify the identity of each component of a product. 211.84(d)(1)*
- **A visual identification is conducted on each lot of containers and closures**
 - *The product containers and/or closures [are/were] not examined visually for container damage or broken seals upon receipt or before acceptance. 211.82(a)*

- **Testing or validation of supplier's test results for components, containers and closures**
 - *Written specifications for each component [does/did] not include:*
 - *Testing for conformity with all appropriate written specifications*
 - *In lieu of such testing, a report of analysis from the supplier of the component, provided that at least one specific identity test is conducted on such component by the manufacturer, and provided that the manufacturer establishes the reliability of the supplier's analyses through appropriate validation of the supplier's test results at appropriate intervals. 211.84(d)(2)*
 - *Written specifications for each container and closure [does/did] not include:*
 - *Testing for conformity with all appropriate written procedures*
 - *In lieu of such testing, a certificate of testing from the supplier, provided that at least a visual identification is conducted on such containers/closures by the manufacturer and provided that the manufacturer establishes the reliability of the supplier's test results through appropriate validation of the supplier's test results at appropriate intervals. 211.84(d)(3)*
 - *The written procedures for examination and testing components [does/did] not include established specifications for contamination. 211.84(d)(5)*
- **Rejection of any component, container, closure not meeting acceptance requirements**
 - *Failure to reject lots of material that did not meet specifications. 211.84(e)*
- **Appropriate retesting/reexamination of components, containers, closures**
 - *After prolonged storage in an uncontrolled area, the product containers and/or closures were not retested or reexamined and approved by the quality control unit. 211.87*
- **Quarantine of rejected materials**
 - *Failure to assure that rejected components, product containers, and/or closures [are/were] identified and controlled under a quarantine system designed to prevent their use in operations for which they are unsuitable. (211.89)*
- **Water and process gas supply, design, maintenance, validation and operation.**
 - *The written specifications for each component [does/did] not include:*
 - *Testing for conformity with all appropriate written specifications*
 - *In lieu of such testing, a report of analysis from the supplier of the component, provided that at least one specific identity test is conducted on such component by the manufacturer, and provided that the manufacturer establishes the reliability of the supplier's analyses through appropriate validation of the supplier's test results at appropriate intervals. 211.84(d)(2)*
- **Containers and closures:**
 - *The product containers and/or closures could not be shown to be non reactive, additive, or absorptive. 211.94(a)*
 - *Standards or specifications, methods of testing, and methods of cleaning, sterilizing, and processing to remove pyrogenic properties [are/were] not written and/or followed for product containers and closures. 211.94(d)*
 - *Final containers and closures [are/were] not made of material that will not hasten the deterioration of the product or otherwise render it less suitable for the intended use. 600.11(h)*
 - *Final containers and closures [are/were] not clean and free of surface solids, leachable contaminants and other materials that will hasten the deterioration of the product or otherwise render it less suitable for the intended use. 600.11(h)*
 - *After filling, sealing [is/was] not performed in a manner that will maintain the integrity of the product during the dating period. 600.11(h)*
- **Cultures and Cell Lines**
 - *Cultures used in the manufacture of products [are/were] not stored [in a secure and orderly manner] [at a temperature and by a method that will retain the initial characteristics of the organisms and insure freedom from contamination and deterioration]. 21 CFR 610.18(a)*
 - *Seed lots [are/were] not identified by [lot number] [date of preparation]. 21 CFR 610.18(b)*
 - *All results of periodic tests for verification of cultures and determination of freedom from extraneous organisms [are/were] not [recorded] [retained]. 21 CFR 610.18(b)*

- *Periodic tests [are/were] not performed on the source strain to verify [the integrity of the strain characteristics] [freedom from extraneous organisms]. 21 CFR 610.18(b)*
- *Each culture [is/was] not clearly identified as to source strain. 21 CFR 610.18(b)*
- *Cell lines used for manufacturing products [are/were] not [identified by history] [described with respect to cytogenetic characteristics and tumorigenicity] [characterized with respect to in vitro growth characteristics and life potential] [tested for the presence of detectable microbial agents]. 21 CFR 610.18(c)*
- *Appropriate records regarding cultures [are/were] not maintained. 21 CFR 610.18(d)*

Production System

Deficiencies in this system may include violative conditions relating to production activities including, but not limited to, batch processing and control records, reprocessing, in process controls, tests and examinations, equipment cleaning and use logs.

- **Written procedures; deficiencies**
 - *Written procedures for production and process controls [does/did] not assure that products have the identity, strength, quality, and purity they purport or are represented to possess. 211.100(a)*
 - *Deviations from the written procedures [are/were] not recorded and justified. 211.100(b)*
- **Adequate procedure for charge-in of components**
 - *Procedures for charge-in of components [do/did] not include:*
 - *Written production and control procedures designed to assure that the products produced, have the identity, strength, quality, and purity they purport or are represented to possess. 211.101*
 - *Formulation of the batch to provide not less than 100 percent of the labeled or established amount of active ingredient. 211.101(a)*
 - *Adequate supervision of component weighing and measuring operations. 211.101(c)*
- **Identification of equipment with contents, and where appropriate phase of manufacturing and/or status**
 - *All compounding and storage containers, processing lines, and major equipment used during the production of a batch of product [are/were] not properly identified at all times to indicate their contents or, when necessary, their phase of processing of the batch. 211.105(a)*
- **Calculation and documentation of actual yields and percentage of theoretical yields**
 - *Actual yields and percentages of theoretical yield [are/were] not determined at the conclusion of each appropriate phase of manufacturing, processing, packaging, or holding of the product. 211.103*
- **Batch production and control records**
 - *Batch production and control records are/were not prepared for each batch of product and/or [do/did] not include complete information relating to the production and control of each batch. 211.188, 600.12(a)*
- **Established time limits for completion of phases of production**
 - *Time limits for the completion of each phase of production, to assure the quality of the product, [has/have] not been established. 211.111*
- **Implementation and documentation of in-process controls, tests, and examinations**
 - *Written procedures that describe the in-process controls, and tests, or examinations to be conducted on appropriate samples of in-process materials of each batch [are/were] not established and/or followed. 211.110(a)*
- **Justification and consistency of in-process specifications and product final specifications**
 - *In-process specifications [are/were] not consistent with product final specifications. 211.110(b)*

- **Prevention of objectionable microorganisms in sterile products**
 - *Appropriate written procedures, including validation of any sterilization process, designed to prevent microbiological contamination of products purporting to be sterile, [are/were] not established and/or followed. 211.113(b), 600.11(b)*
- **Adherence to preprocessing procedures (e.g., set-up, line clearance, etc.)**
 - *Production and process control procedures [are/were] not: 211.100(b)*
 - *Written and/or followed for various production and process control functions*
 - *Documented at the time of performance*
 - *Deviations from the written procedures [are/were] not recorded and justified.*
- **Master production and control records**
 - *Master production and control records [do/did] not include: 211.186*
 - *Complete manufacturing and control instructions*
 - *Sampling and testing procedures*
 - *Specifications*
 - *Special notations and/or precautions to be followed*
 - *Written procedures for preparing the master production and control records*
- **Pooling**
 - *HCT/Ps from two or more donors [are/were] pooled during manufacturing. 1271.220(b)*
- **Storage Temperatures**
 - *HCT/Ps [are/were] not stored at appropriate temperatures. 1271.260(b)*
 - *Recorded storage temperatures [are/were] not periodically reviewed to ensure that temperatures have been within acceptable limits. 1271.260(e)*
 - *Storage temperatures of HCT/Ps [are/were] not [recorded] [maintained]. 1271.260(e)*
 - *Acceptable temperature limits [are/were] not established for the storage of HCT/Ps at each step of the manufacturing process to inhibit the growth of infectious agents. 1271.260(e)*
- **Record Retention**
 - *Records [are/were] not retained for the appropriate length of time, [10 years after their creation] [at least 10 years after the date of administration of a particular HCT/P] [at least 10 years after the date of a particular HCT/Ps distribution, disposition, or expiration, whichever is latest, when the date of administration is not known] [10 years after the appropriate disposition of archived specimens of dura mater]. 1271.270(d)*

Packaging and Labeling System

Deficiencies in this system may include violative conditions relating to packaging operations, and the handling of labels and labeling including, but not limited to, the receipt, inspection, issuance, and reconciliation of labels, and discrepancy investigation and follow-up

- **Acceptance operations for packaging and labeling materials; examination, storage and usage**
 - *The procedures describing the receipt, identification, storage, handling, sampling, examination, and/or testing of labeling and packaging materials [are/were] not written and/or followed. 211.122(a)*
 - *Labeling and packaging materials [are/were] not representatively sampled, examined and/or tested upon receipt and before use in packaging or labeling of product. 211.122(a)*
 - *Labeling and/or packaging materials not meeting appropriate written specifications [are/were] approved and released for use. 211.122(b)*
 - *Labels and other labeling materials for each different product, strength, dosage form, or quantity of contents [are/were] not stored separately and/or suitably identified. 211.122(d)*

- *Printing devices on/or associated with, manufacturing lines used to imprint labeling upon the product unit label or case are/were not monitored to assure that all imprinting conforms to the print specified in the batch production record. 211.122(h)*
- **Control of issuance of labeling, examination of issued labels and reconciliation of used labels**
 - *Labeling issued for use in product labeling operations:*
 - *[Are/were] not strictly controlled 211.125(a)*
 - *[Are/were] not carefully examined for identity and conformity to the labeling specified in the master or batch production records. 211.125(b)*
 - *The quantities of labeling issued, used, and returned are not reconciled, and/or discrepancies between the quantity of finished product and the quantity of labeling issued [are/were] not evaluated. 211.125(c)*
 - *There is no assurance that all excess labeling bearing lot or control numbers [is/was] destroyed. 211.125(d)*
- **Packaging and labeling operations, line clearance, inspection and documentation including validation and security of computerized processes**
 - *Written procedures [are/were] not established, and/or not followed, and/or procedures do not assure that correct labels, labeling, and packaging materials are used. 211.130*
 - *Physical or spatial separation [is/was] not adequate to prevent mix-ups and/or cross-contamination from operations on other products. 211.130(a)*
 - *Filled unlabeled product containers that are set aside and held for future labeling operations [are/were] not identified and/or handled to preclude mislabeling of individual containers, lots, or portions of lots. 211.130(b)*
 - *Products [are/were] not identified with a lot or control number that permits determination of the history of the manufacture and control of the batch. 211.130(c)*
 - *Packaging and labeling facilities [are/were] not inspected immediately before use to assure that all products and packaging and labeling materials not suitable for subsequent operations [are/were] removed. 211.130(e)*
 - *Equipment used in computerized packaging and/or labeling processes [are/were] not routinely calibrated, inspected or checked according to a written program designed to assure proper performance. 211.68(a)*
 - *Changes in the computers and related systems [are/were] not appropriately controlled to assure only authorized personnel performed them. 211.68(b)*
 - *HCT/Ps [are/were] not assigned a distinct identification code that relates the HCT/Ps to the donor and all records related to the product. 1271.290(c)*
 - *Failure to establish a tracking system that enables the tracking of HCT/Ps back and forth from the donor to the consignee or final disposition. 1271.290(b)*
 - *When new identification codes are assigned to HCT/Ps used at this establishment in place of distinct identification codes assigned to the same HCT/Ps by another establishment, procedures for relating the new codes to the old codes [are/were] not established. 1271.290(c)*
 - *Appropriate shipping conditions [are/were] not established for each type of HCT/P. 1271.265(d)*
 - *Packaging and shipping containers [are/were] not [designed] [constructed] to protect HCT/Ps from contamination. 1271.265(d)*
- **Accompanying records**
 - *The distinct identification code affixed to the HCT/P container included an individual's [name] [social security number] [medical record number]. 1271.55(a)(1)*
 - *After the completion of the donor-eligibility determination, HCT/Ps [are/were] not accompanied with a distinct identification code affixed to the HCT/P container. 1271.55(a)(1)*
 - *After the completion of the donor-eligibility determination, HCT/Ps [are/were] not accompanied with a statement whether the donor has been determined to be eligible or ineligible, based on the results of screening and testing. 1271.55(a)(2)*
 - *After completion of the donor-eligibility determination, HCT/Ps [are/were] not accompanied with the summary of the records used to make the donor-eligibility determination. 1271.55(a)(3)*

- *The accompanying records for HCT/Ps included [the donor's name] [personal information that might identify the donor]. 1271.55(c)*
- *The summary of records for HCT/Ps from donors determined to be ineligible based on screening and released for limited use [do/did] not contain a statement noting the reasons(s) for the ineligibility. 1271.55(b)(4)*
- **Control of filled unlabeled containers, later labeled under multiple private labels**
 - *There [are/were] no written procedures for the identification and handling of filled product containers that are set aside and held in unlabeled condition for future labeling operations to preclude mislabeling of individual containers, lots, or portions of lots. .211.130(b)*
- **Expiration dating**
 - *The product labels: [211.137(a), (d)]*
 - *[Do/did] not bear an expiration date determined by appropriate stability testing*
 - *Have expiration dates that [are/were] not related to storage conditions on the label*
 - *[Do/did] not bear expiration dates for both the reconstituted and lyophilized product*
- **Examination of the labeled finished product [211.134(a), (b)]**
 - *Labeled finished products,*
 - *[Are/were] not examined during the finishing operations to provide assurance those containers and packages in the lot have the correct label*
 - *[Are/were] not sampled with a representative number of units for visual examination for correct labeling at the completion of finishing operations*
 - *[Do/did] not include documentation of examination operations*
- **Complete labeling control records, including specimens or copies of all labeling used**
 - *Records [are/were] not maintained for each shipment of each different labeling and packaging material indicating receipt, examination or testing. 211.122(c)*
 - *Records documenting the examination and review of labels and labeling for conformity with established specifications [are/were] not maintained. 211.184(d)*
 - *Batch production and control records [do/did] not include complete labeling control records including specimens or copies of all labeling used. 211.188(b)(8)*

Laboratory Control System

Deficiencies in this system may include violative conditions relating to laboratory functions including, but not limited to, staffing, facilities, calibration and maintenance of equipment, specifications and standards, sampling plans and testing methodology.

- **Written procedures and control system for laboratory operations**
 - *Specifications, standards, sampling plans, test procedures, or other laboratory control mechanisms, including any changes, [are/were] not drafted by the appropriate organizational unit and/or reviewed and approved by the quality control unit. 211.160(a)*
- **Calibration and maintenance programs for analytical instruments and equipment**
 - *There [are/were] no written procedures, or procedures are not followed for the calibration of instruments, apparatus, gauges, and recording devices at suitable intervals containing specific directions, schedules, limits for accuracy and precision, and provisions for remedial action in the event accuracy and/or precision limits are not met. 211.160(b)(4)*
- **Adherence, validation/verification to the written methods of analysis**
 - *There [are/were] no written procedures describing method of sampling and the number of units per batch to be tested. 211.165(c)*
 - *The accuracy, sensitivity, specificity, and reproducibility of test methods employed by the firm [are/were] not established and/or documented. 211.165(e)*

- **Testing and release for distribution**
 - *Laboratory testing [does/did] not determine conformance to final specifications, including identity and strength of each active ingredient, prior to release of each batch of product 211.165(a)*
 - *Appropriate laboratory testing [is/was] not performed for each batch of product required to be free of objectionable microorganisms. 211.165(b)*
 - *HCT/Ps that [are/were] [in quarantine] [contaminated] [recovered from a donor determined to be ineligible] [recovered from a donor for whom a donor eligibility determination has not been completed] [determined to not meet release criteria designed to prevent communicable disease transmission] were made available for distribution. 1271.265(c)(2)*
- **Specifications, standards, and representative sampling plans**
 - *Laboratory controls [do/did] not include scientifically sound and appropriate specifications, standards, sampling plans, and test procedures designed to assure components and products conform to appropriate standards of identity, strength, quality and purity. 211.160(b)*
- **Stability testing program, including demonstration of stability indicating capability of the test methods**
 - *The written testing program designed to assess the stability characteristics of products [do/did] not include:*
 - *The sample size and test intervals for each attribute tested*
 - *Storage conditions for samples retained for testing 211.166*
- **Special testing requirements**
 - *Failure to conduct appropriate laboratory testing for each batch of drug product purporting to be sterile and/or pyrogen-free 211.167(a)*
- **Adequate reserve samples; documentation of reserve sample examination**
 - *An appropriately identified reserve sample(s), of adequate number, representative of each lot or batch of product [is/was] not retained and/or stored under conditions consistent with product labeling and/or in the same immediate container-closure system.*
 - *Reserve samples [are/were] not examined visually at least once a year for evidence of deterioration. 211.170*
- **Required testing is performed on the correct samples**
 - *In the determination of conformance to appropriate written specifications:*
 - *The samples [are/were] not representative and/or adequately identified for each lot of components 211.160(b)(1)*
 - *The samples [are/were] not representative and/or adequately identified. 211.160(b)(2)*
 - *The samples [are/were] not representative and/or adequately identified for the products. 211.160(b)(3)*
- **Laboratory records**
 - *[Do/did] not include:*
 - *A statement of each method used in the testing of the sample, indicating the location of data that establishes the methods used in the testing of the sample met proper standards of accuracy and reliability as applied to the product tested. 211.194(a)(2)*
 - *A complete record of all data derived from all tests necessary to assure compliance with established specifications and standards, including examinations and assays. 211.194*
 - *A complete record of all data secured in the course of each test, including all graphs, charts, and spectra from laboratory instrumentation, properly identified to show the specific component, product container, closure, in- process material, or product, and lot tested. 211.194(a)(4)*
 - *A record of all calculations performed in connection with the test, including units of measure, conversion factors, and equivalency factors. 211.194(a)(5)*

Donor Eligibility System

Deficiencies in this system may include violative conditions relating to donor eligibility including, but not limited to, donor screening, donor testing, quarantine of products before completion of the donor eligibility determination, storage of products from ineligible donors, and use of products in cases of urgent medical need.

● **Donor Eligibility Procedures**

- *Procedures for all steps performed in the [testing] [screening] [determining] of donor eligibility of HCT/Ps [are/were] not established. 1271.47(a)*
- *Procedures [are/were] not designed to ensure compliance with the donor eligibility requirements. 1271.47(a)*
- *Donor eligibility procedures [are/were] not [reviewed] [approved] by a responsible person before implementation. 1271.47(b)*
- *Donor eligibility procedures [are/were] not available to personnel in the area where operations are performed, or in a nearby area when such availability is impractical. 1271.47(c)*
- *Departures from donor eligibility procedures relevant to preventing risks of communicable disease transmission [are/were] not [recorded] [justified]. 1271.47(d)*

● **Donor Eligibility Determination**

- *HCT/P donors [are/were] not determined to be eligible based on the results of donor screening and testing. 1271.50(a)*
- *The eligibility of an HCT/P donor [is/was] not [determined] [documented] by a responsible person, based on results of donor screening and donor testing. 1271.50(a)*
- *Donor screening of HCT/P donors considered eligible indicated that the donor [is/was] not free of [risk factors for infection due to communicable disease agents] [clinical evidence of infection due to communicable disease agents] [risk factors associated with xenotransplantation]. 1271.50(b)(1)*
- *Donor testing of HCT/P donors considered eligible [is/was] not negative or nonreactive for relevant communicable disease agents. 1271.50(b)(2)*

● **Records**

- *Documentation [is/was] not maintained after the donor-eligibility determination was complete. 1271.55(d)(1)*
- *Documentation of [the results and interpretation of all relevant testing for communicable disease agents] [the name and address of the communicable disease testing laboratory or laboratories] [is/was] not maintained. 1271.55(d)(1)(i)*
- *Documentation of [the results] [the interpretation] of all donor screening for communicable diseases [is/was] not maintained. 1271.55(d)(1)(ii)*
- *Documentation of [the donor-eligibility determination] [the responsible person who made the donor-eligibility determination] [the date of the donor-eligibility determination] [is/was] not maintained. 1271.55(d)(1)(iii)*
- *Donor eligibility records [are/were] not accurate, indelible, or legible. 1271.55(d)(2)*
- *Required donor eligibility records [are/were] not made available for authorized inspection or upon request by FDA. 1271.55(d)(3)*
- *Records pertaining to HCT/Ps [are/were] not retained [at least 10 years after the date of administration] [at least 10 years after the date of distribution, disposition, or expiration, whichever was latest when the date of administration of the HCT/P was unknown]. 1271.55(d)(4)*

● **Quarantine and Other Requirements Before Completion of Donor Eligibility Determination**

- *HCT/Ps [are/were] not kept in quarantine until completion of the donor-eligibility determination. 1271.60(a)*
- *HCT/Ps in quarantine pending completion of the donor eligibility determination [are/were] [not clearly identified as quarantined] [not easily distinguishable from HCT/Ps available for release and distribution]. 1271.60(b)*

- HCT/Ps shipped prior to the completion of the donor-eligibility determination [are/were] not kept in quarantine during shipment. 1271.60(c)
- HCT/Ps shipped in quarantine prior to the completion of the donor-eligibility determination [are/were] not accompanied by records that identified the donor of the HCT/P. 1271.60(c)(1)
- HCT/Ps shipped in quarantine prior to the completion of the donor-eligibility determination [are/were] not accompanied by records that stated the donor-eligibility determination had not been completed. 1271.60(c)(2)
- HCT/Ps shipped in quarantine prior to the completion of the donor-eligibility determination [are/were] not accompanied by records that stated the product must not be implanted, transplanted, infused or transferred until completion of the donor-eligibility determination. 1271.60(c)(3)
- There [is/was] no documentation of the urgent medical need that resulted in the infusion of an HCT/P from a donor for whom the donor-eligibility determination was not complete. 1271.60(d)(1)
- HCT/Ps made available for use in cases of urgent medical need [are/were] not prominently labeled ["NOT EVALUATED FOR INFECTIOUS SUBSTANCES"] ["WARNING: advise patient of communicable disease risks"]. 1271.60(d)(2)
- HCT/Ps made available for use in cases of urgent medical need [are/were] not accompanied by [the results of any donor screening and testing that has been completed] [a list of any screening or testing not completed]. 1271.60(d)(2)
- There [is/was] no documentation of the notification to the physician that the donor eligibility determination of HCT/Ps used in cases of urgent medical need was not complete. 1271.60(d)(3)
- The donor-eligibility determination [is/was] not completed for HCT/Ps used in cases of urgent medical need. 1271.60(d)(4)
- The physician [is/was] not informed of the results of the donor-eligibility determination for HCT/Ps used in cases of urgent medical need. 1271.60(d)(4)

- **Storage and Use of HCT/Ps from an Ineligible Donor**

- HCT/Ps from ineligible donors [are/were] not [stored] [identified] in a manner to prevent improper release. 1271.65(a)
- HCT/Ps from ineligible donors which [are/were] made available for limited use were not prominently labeled. 1271.65(b)(2)
- HCT/Ps from ineligible donors which [are/were] made available for limited use were not prominently labeled with [the Biohazard legend] [a statement warning of communicable disease risks] [a statement warning of the reactive test results]. 1271.65(b)(2)
- HCT/Ps from ineligible donors which [are/were] made available for limited use were not accompanied by required records. 1271.65(b)(2)
- There [is/was] no documentation of the notification to the physician of the results of screening and testing of HCT/Ps from ineligible donors which were made available for limited use. 1271.65(b)(3)

- **Donor Screening**

- Donors [are/were] not screened by a review of relevant medical records for [risk factors] [clinical evidence] of communicable disease agents and diseases. 1271.75(a)(1)
- Donors [are/were] not screened by a review of relevant medical records for disease risks associated with xenotransplantation. 1271.75(a)(2)
- Donors of leukocyte-rich cells or tissues [are/were] not screened by a review of relevant medical records for [risk factors] [clinical evidence] of cell-associated communicable disease agents and diseases. 1271.75(b)
- Donors [are/were] not determined to be ineligible that had [risk factors or clinical evidence of communicable disease agents] [communicable disease risks associated with xenotransplantation]. 1271.75(d)

- **Donor Testing**

- *A sample from the birth mother of a donor one month of age or younger [is/was] not used for testing of communicable disease agents. 1271.80(a)*
- *Donor specimens used for testing of communicable disease agents [are/were] not collected at the appropriate time. 1271.80(a)*
- *Communicable disease agent tests [are/were] not FDA-licensed, approved or cleared donor screening tests. 1271.80(c)*
- *Testing for communicable disease agents [is/was] not performed in accordance with the manufacturer's instructions. 1271.80(c)*
- *Testing for communicable disease agents [is/was] not performed by a laboratory certified to perform such testing on human specimens under the Clinical Laboratory Improvement Act of 1988 or has met equivalent standards determined by the Centers for Medicare and Medicaid Services. 1271.80(c)*
- *Donors whose specimens test reactive on screening tests for communicable disease agents [are/were] not determined to be ineligible. 1271.80(d)(1)*
- *Donors [are/were] not determined to be ineligible whose communicable disease test specimens were plasma diluted, and [the donor was not tested using a specimen which was taken before transfusion or infusion and within seven days before recovery of the cells or tissue] [an appropriate algorithm was not used to determine that the plasma dilution did not affect the test results]. 1271.80(d)(2)*

PART VI - REFERENCES AND PROGRAM CONTACTS

A. REFERENCES:

1. Federal Food, Drug, and Cosmetic Act, and Related Laws.
2. Public Health Service Act.
3. Title 21, Code of Federal Regulations, Parts 11, 210, 211, 314, 600, 601, 606, 607, 610, 640, 680, and 1271.
4. Compliance Program Guidance Manual, CP 7356.002, Drug Manufacturer Inspections; CP 7356.002A, Sterile Drug Process Inspections.
5. Guidance on Alternatives to Lot Release for Licensed Biological Products, CBER, July 1993.
6. Guidance to Industry: Content and Format of Chemistry, Manufacturing and Controls Information and Establishment Description Information for a Vaccine or Related Product, January 1999.
7. Guideline on General Principles of Process Validation, 1987
8. Compliance Policy Guide (CPG), Process Validation Requirements for Drug Products and Active Pharmaceutical Ingredients Subject to Pre-Market Approval (CPG 7132c.08, Sec 490.100, March 2004.
9. Guidance for Industry, Sterile Drug Products Produced by Aseptic Processing – Good Manufacturing Practice, September 2004.
10. Guide to Inspections of High Purity Water Systems, ORA/ORO, June 1993.
11. Guide to Inspection of Pharmaceutical Quality Control Laboratories, July 1993.
12. Guide to Inspection of Microbiological Pharmaceutical Quality Control Laboratories, July 1993.
13. Guide to Inspection of Validation of Cleaning Processes, July 1993.
14. Guide to Inspections of Lyophilization of Parenterals, ORA/ORO/DFI, July 1993.
15. Points to Consider in the Manufacture of Recombinant DNA Derived Products, Monoclonal Based In Vitro and In Vivo Products, CBER.
16. United States Pharmacopoeia, Current Revision and Supplements.
17. International Conference on Harmonization Guideline; Quality of Biotechnological Products: Stability Testing of Biotechnological/Biological Products, November 1995.
18. FDA Investigations Operations Manual, Sections 500-529, 560-565, 590-595, 635, 773, 921, 924, 927-928, 1026 and appendix B. http://www.fda.gov/ora/inspect_ref/iom/
19. FDA Regulatory Procedures Manual (RPM), Chapter 4- Advisory Actions, Chapter 5 - Administrative Actions, Chapter 6 - Judicial Actions, Chapter 7- Recall and Emergency Procedures, Chapter 9 - Import Operations/Actions. <http://www.fda.gov/ICECI/ComplianceManuals/RegulatoryProceduresManual/default.htm>
20. FDA Compliance Policy Guides, Chapter 1- General and Chapter 2 - Biologics. http://www.fda.gov/ora/compliance_ref/cpg/default.htm
21. Glossary of Computerized System and Software Development Terminology, August 1995.
22. Guide to Inspection of Computerized Systems in Drug Processing, February 1983.
23. [Guidance for Industry, Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products](#), August 2007
24. [Guidance for Industry, Validation of Procedures for Processing of Human Tissues Intended for Transplantation](#), March 2002

25. [Guidance for Industry, Compliance with 21 CFR Part 1271.150\(c\)\(1\) – Manufacturing Arrangements](#), September 2006
26. [Guidance for Industry, Regulation of Human Cells, Tissues, and Cellular and Tissue-Based Products \(HCT/Ps\) - Small Entity Compliance Guide](#), August 2007
27. [Guidance for Industry, Minimally Manipulated, Unrelated Allogeneic Placental/Umbilical Cord Blood Intended for Hematopoietic Reconstitution for Specified Indications](#), October 2009

B. PROGRAM CONTACTS:

CBER

For questions regarding CBER policy or requests for assistance: OCBQ, HFM-600

1. Division of Inspections and Surveillance, HFM-650

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- **Program Surveillance Branch, HFM-654**

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2. Division of Case Management, HFM-610

Diane Alexander, Chief, Biological Drug and Device Compliance Branch
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License Denials, Debarment, Civil Money Penalties, Application Integrity, Biological Product Recalls, License Suspensions, Revocations and Denials Warning Letters, Seizures, Injunctions, Citations, Prosecutions, Import/Export Programs, Compliance Status Checks, Certificates of Export, Advertising and Promotional Labeling

Mailing Address for CBER Contacts:

Food & Drug Administration
Center for Biologics Evaluation and Research
Office of Compliance & Biologics Quality
Division of Inspections and Surveillance, HFM-650
1401 Rockville Pike
Suite 200N
Rockville, MD 20852-1448

3. CBER Sample Custodian, HFM-672

301-594-6517

Center for Biologics Evaluation and Research
Attention: Sample Custodian, HFM-672
5516 Nicholson Lane, Building B, Room 113
Kensington, MD 20895

ORA/ORO

For questions regarding inspection policy or requests for guidance, and Team Biologics contact:

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Director, Division of Domestic Field Operations
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Team Biologics Supervisor, HFC-130
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Office of Enforcement

For questions pertaining to recalls:

Recall Operations Staff
Division of Compliance Management and Operations, HFC-210
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PART VII – COORDINATION AND PROGRAM MONITORING

CBER/OCBQ/DIS will work cooperatively with ORA, the Biological Products Field Committee, and the Team Biologics Operations Group to monitor the inspectional and compliance accomplishments under this compliance program, and the status of the inspected industry establishments.

The ORA annual workplan, developed by CBER and ORA, provides overall resource allocations and anticipated numbers of inspections. However, current industry practices encountered during an inspection, the past compliance history of establishments, or other compliance developments, may necessarily result in unplanned inspections or in individual CGMP inspections taking more or less time than estimated in the workplan.

As is customary, ORA continues to have the primary responsibility for ensuring:

- (1) That the program strategies, priorities, and procedures articulated in this compliance program are followed by the ORA staff, and
- (2) Potential problems or needs for policy/program clarification are brought to the attention of CBER/OCBQ and the Team Biologics Operations Group.

CBER and ORA jointly coordinate activities to achieve industry compliance with applicable laws, regulations, and Court orders (e.g., Consent Decrees of Permanent Injunction).

CBER/OCBQ will continue to use accomplishment data from the ORA Field Accomplishment and Compliance Tracking System (FACTS), administrative or judicial action recommendations, requests for policy decisions/clarification received from the public or the industry, and input from CBER scientific and product experts to provide overall direction to FDA's CGMP initiatives, which are supported by this risk-based strategic compliance program.

The Team Biologics Operations Group conducts periodic conference calls and/or meetings with participation by ORA and CBER units.

CBER/OCBQ/DIS provides appropriate background material, including license and lot release information, and copies of applicable CBER correspondence and reports, to the Team Biologics investigators prior to scheduled inspections.

CBER/OCBQ will carefully evaluate the experience with this systems-based inspection program through inspection reports and other compliance data to determine its effectiveness and to continually assess and improve the quality of the CBER products inspection program. It also will carefully review industry compliance, product developments within industry, and the safety and quality of CBER-regulated biological drug products will likewise be closely monitored.

ATTACHMENTS - Product Guidance

1 – Fractionators

2 – Vaccines

3 - Recombinant Products

4 - Allergenics

Flow Diagram

Appendices to Flow Diagram

5 – Minimally manipulated, unrelated allogeneic umbilical cord blood (Hematopoietic Progenitor Cells, Cord (HPC-C))

6 – Pre-license and Pre-approval inspections

ATTACHMENT 1

FRACTIONATORS

Plasma Fractionation

Blood plasma contains a mixture of thousands of different kinds of proteins, only a few of which are of therapeutic interest. To make plasma derivative products, plasma can be treated with a variety of substances to separate the desired proteins from others, in a process called fractionation. Cohn and co-workers at Harvard Medical School developed fractionation of plasma, from pools often derived from thousands of donors, during World War II. Today, most plasma derivative manufacturers use a modified Cohn method developed by Oncley (Cohn-Oncley fractionation process) or further variants of this method, which permit manufacture of additional products.

Fractionation by the Cohn-Oncley method relies on precipitation of plasma proteins by a combination of cold alcohol (usually ethanol)-water mixtures and adjustments of pH, ionic strength, temperature, and protein concentration. Alternatively, some manufacturers separate plasma derivatives by column chromatography using ion exchange, gel filtration, or affinity methods, without alcohol. In all cases, fractions of plasma are separated sequentially, with the product from one step, such as the precipitate and/or supernatant, becoming the starting material for the next step in the fractionation process. If each step is not done properly, subsequent fractions can be adversely affected. Thus, the integrity of each final product is dependent on all of the preceding steps in the process.

Plasma derivatives are similar to other biological products in that they are protein-based and subject to denaturation at high temperatures. These products are usually filled by using aseptic processing techniques, and cannot be terminally sterilized, although in some instances they can be heat-treated in the final container to effect viral inactivation.

Materials System

Source Material

The types of source material used and their suppliers are important. The material should be either licensed Source Plasma or unlicensed Recovered Plasma. Recovered Plasma is a product for which no published standards exist beyond labeling requirements included in 21 CFR 606.121. Licensed manufacturers must provide assurances that plasma for fractionation has been properly processed from the time of collection, and that it does not contain disease-causing agents or contaminants. The plasma for fractionation must be tested and found negative for Anti-HIV-1, Anti-HIV-2, Anti-HCV, HBsAg, and HIVag.

Recovered Plasma can be used if there is a valid short supply agreement in effect with each supplier (see 21 CFR 601.22). The only way in which unlicensed source material may be shipped for use in a licensed product is under short supply. The short supply agreement should include the manufacturer's acceptance criteria for the plasma, e.g., storage/shipping temperatures, viral testing, etc.

Storage of Bulk Fraction

Bulk concentrates should be held and stored in compliance with approved license applications and applicable regulations; see 21 CFR 640.81(d) for Albumin; 21 CFR 640.91(d) for PPF, and 21 CFR 640.102(c) for IG. Many manufacturers store bulk paste below -20 degrees C.

Production System

Pooling

At the minimum, it is recommended that pooling be conducted in an environmentally controlled, but not necessarily classified area (one with some level of particulate control). Manual pooling may take place either in jacketed tanks or in tanks in a temperature controlled area.

Fractionation

Control of the process is essential, since each step yields the starting material for the following steps in the process. Review of the firm's product specific flow diagram(s) may be useful in following the process.

Other areas to consider include; special centrifuges, collection of pastes (precipitates recovered by using centrifugation techniques or filter presses during the fractionation process), filter press operations, filter aid addition, and acetone drying process.

Column Purification

Column chromatography may be used for some plasma derivatives, e.g., coagulation proteins and some immune globulin products. Conditions for collection of active material should be well defined in batch records, and correctly controlled so as to exclude unrelated material.

Column cleaning, rinsing, testing for residuals, and regeneration procedures are very important. Columns not in use should be stored under conditions that inhibit microbial growth and prevent chemical or physical alteration of the medium.

Incubation

Following heat treatment, final containers of Albumin and PPF are incubated at 20-35 degrees C for at least 14 days; see 21 CFR 640.81(g) and 21 CFR 640.91(g).

ATTACHMENT 2

VACCINES

There are many special public health considerations applicable to vaccines and their use. In most cases, vaccines are administered prophylactically, with the intent to stimulate the immune system, and reduce or prevent future occurrence of disease. Vaccines are, therefore, generally administered to healthy individuals, including small children and military personnel. Examples of standard childhood vaccines include; Diphtheria, Tetanus, and Acellular Pertussis; Inactivated Polio Vaccine; Haemophilus influenzae type b; Hepatitis B; and Measles, Mumps, and Rubella. Vaccines may be administered to individuals who have been exposed to a particular infectious agent, in an attempt to prevent the individual from developing the disease. Other vaccines may be administered to alter the course of a non-infectious disease, such as Bacillus Calmette Guerin for the treatment of bladder cancer. Vaccine related products, such as diagnostic skin test antigens, e.g. tuberculin PPD, identify persons having an immune response to a particular organism, which may be indicative of an infection.

Many vaccine manufacturers are sole suppliers of specific vaccines or related products.

Facilities and Equipment System

Cross-contamination is a significant concern in facilities that manufacture more than one product. There are specific regulatory requirements aimed at preventing cross-contamination with regard to spore-forming organisms and live vaccines. The regulations, found in 21 CFR 600.10 and 600.11, require that personnel, buildings, and equipment used for processing spore-forming organisms and live vaccines be isolated from other processes, so as to prevent contamination and cross-contamination.

Materials System

Active vaccine components are derived from many sources. A vaccine may be a live attenuated preparation of bacteria, viruses or parasites; inactivated (killed) whole organisms; irradiated cells; crude fractions or purified immunogens (including recombinant DNA derived products); synthetic antigens; or others. A vaccine product may include a combination of the sources described above. Vaccines may also contain adjuvants, which potentiate the immune response to the active component.

Production System

Cell Culture

Includes inoculation of the initial vessel with the starting materials and scale up.

Disruption and Harvest

Disruption (when appropriate) and harvesting of the product is performed using chemical, physical, or enzymatic means. All process parameters should be specified and documented in the batch production records.

Adventitious Agent Removal

For products derived from cells of human or animal origin, viral removal must be performed in accordance with the process described in the approved license application. In some manufacturing operations there may be a specific viral removal step. In other operations, viral removal may be accomplished by a step or series of steps in the manufacturing process, which are not specifically considered to be for viral removal, e.g., chromatography.

Purification

Purification of vaccine bulks may include one or more of the following methods:

- a) Column or batch chromatography
- b) Centrifugation
- c) Filtration
- d) Precipitation followed by filtration or centrifugation

Adsorption

Adsorption is the process of adding an aluminum adjuvant to a vaccine antigen in order to increase its immunogenicity. Aluminum adjuvants of various formulations are used in vaccine production. The vaccine manufacturer should specify the quality attributes of the adjuvant, including percent purity, particle size, and protein binding capacity. Quality attributes are generally specified on Certificates of Analysis (COA) provided by the adjuvant manufacturer. Batch records must specify the type of adjuvant used.

Aluminum adsorption may be performed on intermediates, bulks, or both. Two general procedures are used for aluminum adsorption: (1) addition of pre-formed aluminum adjuvant to vaccine antigens, and (2) on-site formulation of an aluminum adjuvant. For some vaccines, conditions for binding the aluminum adjuvant to the antigen may be known, and specifications will be established for this process. However, for many products, the scientific mechanism for binding the aluminum adjuvant to the antigen has not been determined, and therefore, no binding specifications will be established.

The extent of adsorption of an aluminum adjuvant to an antigen may be affected by production process parameters such as pH, phosphate concentration, and adequate mixing. These adsorption process parameters should be specified by the manufacturer, in order to promote consistency in manufacturing.

Note: Products containing aluminum adjuvant are formulated aseptically because once they are alum adsorbed they cannot be sterile-filtered.

Inactivation

If the active ingredient of the vaccine is a killed or inactivated version of a live bacteria or virus, the methods for inactivation will have been established by the manufacturer and reviewed during product approval. Either heat or chemical treatment may be used for inactivation. All process parameters should be monitored and appropriate testing performed to demonstrate inactivation. Appropriate containment procedures should be established for the agent being inactivated.

If the active ingredient of the vaccine is a bacterial toxin, methods of toxin inactivation will also have been established by the manufacturer and reviewed during product approval. Treatment with formaldehyde is an example of toxin inactivation. All process parameters should be monitored, and appropriate testing performed to demonstrate inactivation of the toxin.

Conjugation

Conjugate vaccines are generally formed by the chemical linkage of polysaccharide immunogens to a carrier protein. Polysaccharide immunogens are extracted from bacterial cells. Carrier proteins are usually derived from bacterial cells that are different from those used to produce the polysaccharide. The polysaccharide immunogens and the carrier proteins are purified using a variety of methods including; centrifugation, buffer exchange, diafiltration, and chromatography. The purification process should be monitored through in process testing in order to assure the purity of the polysaccharide and carrier protein, and to assure removal of product and process related impurities. Specifications for in-process testing should be specified and results documented in the batch production records.

After purification of the polysaccharide and carrier protein, a chemical reaction(s) is (are) used to covalently link the two molecules together. The reaction should be monitored in order to determine completion of the conjugation reaction, amount of impurities, yield, and purity of the final conjugate product. Additional purification steps may be employed to remove excess reagents and reaction by-products. In addition, post-purification steps may be performed to produce a stabilized conjugate.

Endotoxin Levels

Some bacterial vaccines are manufactured from gram-negative organisms, which produce endotoxin. In these types of vaccines, the endotoxin is often the immunizing agent of interest, and the manufacturer will have defined specifications for endotoxin levels in the final product. The production and testing records should be routinely reviewed to assure that the final product meets the pre-defined endotoxin specifications.

Finished Products

For vaccines and related products, the biological drug substance may be diluted, adsorbed with adjuvant, mixed with stabilizers, mixed with preservative, and/or lyophilized to become the final finished product. In addition, more than one vaccine can be formulated together to produce a combination vaccine product. There are several different final container/ closure systems for vaccine products. Examples include capsules (blister packed), sachets, oral solutions, sealed glass ampules, single-dose syringes, and single-dose and multi-dose vials (solutions or lyophilized).

ATTACHMENT 3

RECOMBINANT PRODUCTS

While the specifics of each manufacturing operation may be different, the manufacture of recombinant biological drug products has a number of common elements. The process usually begins with a master cell bank (MCB), which is derived from a single cell or colony, and is stored to assure genetic stability. The MCB provides source material for the working cell bank (WCB), which is used to initiate the production batch.

One method of propagating sufficient cells to manufacture product is through fermentation. Fermentation is the process of multiplying the cells from the WCB into a quantity sufficient to extract the desired product. Cells from the WCB are inoculated into a medium to begin fermentation.

After a number of passages in small vessels (usually flasks), the inoculated medium is added to a fermentation vessel, usually a bioreactor. At the conclusion of the fermentation process, the cells are subjected to a variety of purification steps, which are designed to remove extraneous cellular material and/or media components, and inactivate or remove any adventitious agents.

Purification can include filtration, chromatography, extraction, and enzyme digestion. The resulting final bulk product may be filled in this form, further diluted and filled, or lyophilized before filling.

Components

Master Cell Bank (MCB) and Working Cell Bank (WCB)

i. Storage Conditions

The storage conditions for the MCB and WCB should be clearly defined, and a system in place to ensure that the storage conditions are maintained. If the storage requirements specify a temperature limitation, there should be documentation of routine temperature readings, and a working alarm system in place in case the temperature deviates from the established one.

ii. Identification

There should be documentation that the WCB was characterized and met specifications before use. If any WCB that did not meet specifications was used, determine which lot(s) of product was manufactured from the WCB and the disposition of the product.

The firm should have records to show the origin and history (number of passages) of the MCB and WCB.

iii. Handling of the WCB

Review the records for inventory and handling of the WCB and ensure they are adequate to protect the integrity of the cells. Verify the firm has records to show which WCB is used to initiate a production batch.

iv. New MCB

The firm must have an approved license application or submit a supplement to its license before generating a new MCB from a WCB. The firm should also have records documenting that the new MCB was tested and properly characterized.

Endotoxins

Production should be performed in a controlled environment that prevents an increase in the product's microbial load beyond its design specifications. Procedures to prevent equipment or product contamination by any substance that could reasonably be expected to have an adverse effect on product quality should be in place and followed. Precautions should be taken to prevent contamination or cross-contamination in areas for the preparation of cell banks. Product manufacturing processes capable of promoting microbiological growth should be monitored for bioburden on a routine basis.

Fermentation/Bioreactors

The fermentation process includes inoculation of the initial vessel with the WCB and scale-up. Often the early passages are conducted in open vessels under laminar flow. The larger vessels are generally closed systems. If the system is closed, there should be no breaks in the system. All steps in the process should be recorded in the batch record.

Disruption and Harvest

Disruption (when appropriate) and harvesting of the product is performed using chemical, physical, or enzymatic means. All essential parameters should be documented.

Purification

Purification is generally performed using a combination of column chromatography, filtration and centrifugation. The method being used should be the same as the approved process and all steps should be documented in the batch record.

ATTACHMENT 4

ALLERGENICS

Under the Public Health Service Act (PHS Act), CBER licenses allergenic products that are used for the diagnosis and treatment of individuals with hypersensitivity to various materials. Allergenic products covered by this compliance program are biological products that are administered to man for the diagnosis, prevention, or treatment of allergic diseases. The products are manufactured from source materials that may include pollen, insects, mold, food and animals.

In addition to meeting the definition of a biological product, allergenic products also fall within the definition of a drug as found in Section 201(g) of the Federal Food, Drug, and Cosmetic Act (FD&C Act). Consequently, these products are regulated and inspected by authorities delegated under the PHS Act, the FD&C Act, and other authorities, including the applicable sections of the Biologics regulations (21 CFR Parts 600-680) and the Drug regulations (especially Parts 210 and 211, Current Good Manufacturing Practice).

There are currently two types of allergenic products licensed for use: allergen patch tests and allergenic extracts. This program is not intended to address allergen patch tests. Allergenic extracts are injectable products that are manufactured from natural substances, such as molds, pollens, insect venoms, animal hair, and foods, known to elicit allergic reactions in susceptible individuals. Allergenic extracts are required to be sterile.

Standardized and Non-standardized

Allergenic extracts are currently manufactured in two forms: standardized and unstandardized (non-standardized). Standardized allergenic extracts must be tested for safety, identity, sterility, potency, and stability. Potency testing is performed by comparison to a US reference standard. CBER maintains and distributes the US reference standards. Standardized allergens are also subject to CBER lot release. Extracts for which there are no US reference standards are called non-standardized or unstandardized extracts. Non-standardized allergenic extracts are not subject to CBER lot release. Non-standardized allergenic extracts should be tested for safety and sterility. Exceptions to the testing required in 21 CFR 610.11 and 610.12 are found in 21 CFR 680.3(b) and (c).

Prescription Sets

Prescription sets are manufactured from bulk or (licensed) stock concentrates in accordance with an individual physician's prescription. The composition of prescription sets is generally considered to be the pharmacy practice (regulated by State authorities), and as such, is not subject to this program. However, investigators should confirm that the facility has a valid prescription on file for each set, and that the bulk or stock concentrates used to manufacture the sets were manufactured in accordance with CGMPs

Materials System

Source Material

The source material contains the active substance, which is responsible for the allergic response. Source materials and source material manufacturers are not required to register or list, and are not licensed. These materials are not finished biological drug products, so manufacturers are not held to the requirements in Part 211.

Source material suppliers are subject to the requirements in 21 CFR Parts 600-680. Specific criteria for source materials can be found in 21 CFR 680.1(b) and (c). Because source materials are components of a biological drug, they must be manufactured in accordance with the general principles of CGMPs.

Most finished product manufacturers obtain their source materials from source material suppliers. If the finished product manufacturer manufactures its own source materials, the source material manufacturing operations should be inspected, if it is within the same facility or a facility in close proximity to the finished manufacturing site.

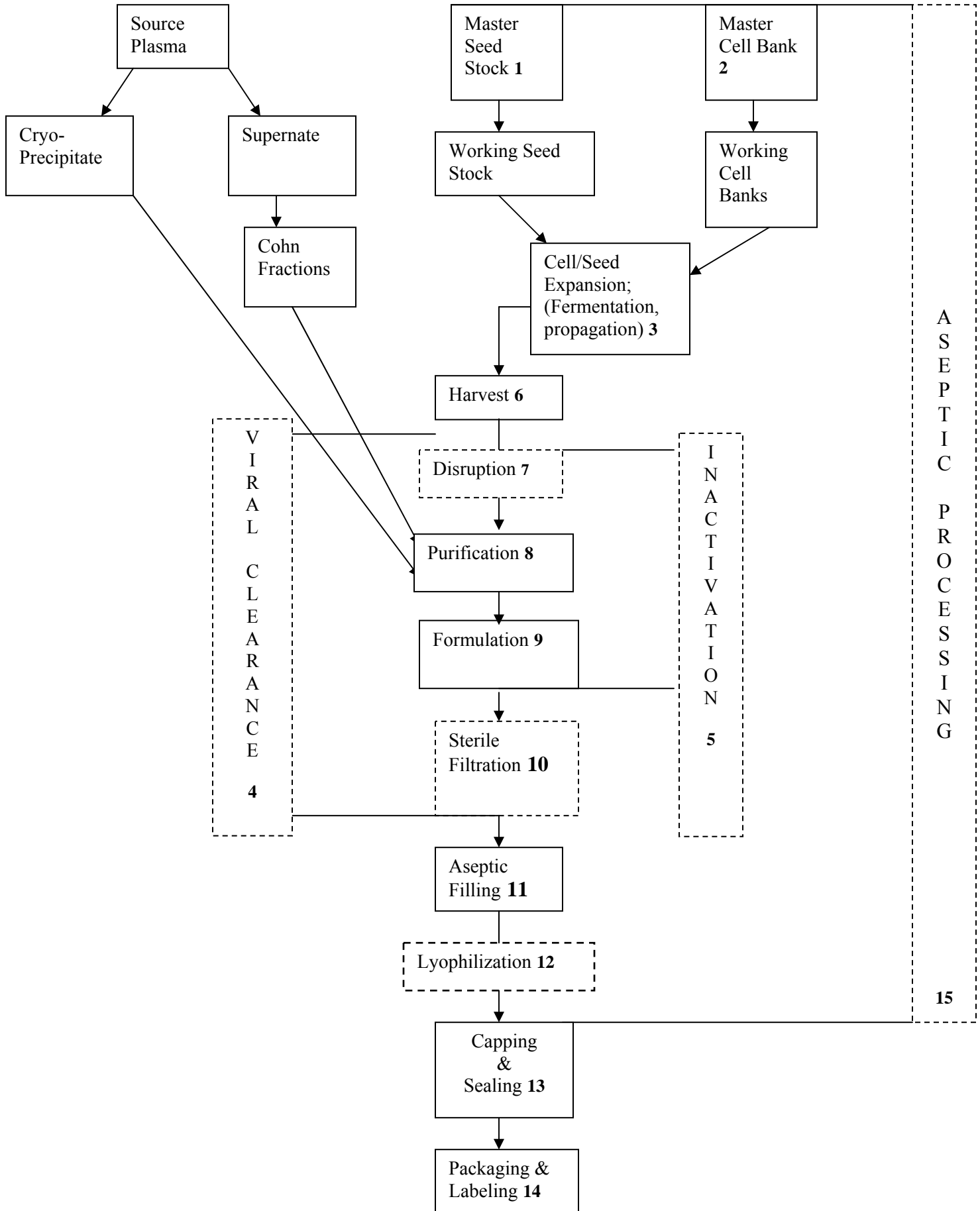
Per 21 CFR 680.1(c), allergenic product manufacturers must list with CBER the name and address of each source material supplier. The list must be updated annually. The source material suppliers should be the same as those reported to CBER.

Animal Source Materials

Animals of the equine genus are treated to maintain immunity to tetanus and reports of any diseases in 680.1(b)(3)(iv) should be reported to CBER as required.

**Fractionated Plasma Products
Attachment 1**

**Vaccine and Recombinant Product
Attachments 2 and 3**



1. Seed Banks

Master Viral Seed (MVS) and Working Viral Seed(s) (WVS)

By definition, a WVS consists of material having the same composition and origin, with a specific lot number and date of manufacture, and, in many cases, is one passage removed from the MVS. The MVS, and at least one WVS, should be qualified for use during the licensing process. The firm should have a complete history for the MVS and the WVS, including the passage history and testing profiles for each. The storage and handling of the viral seeds and the use of WVS in vaccine manufacture are extremely important. Batch records should clearly indicate the WVS used.

New Viral Seed

A new MVS for a licensed product requires a CBER approved supplement prior to release of any vaccine derived from the new MVS. A new WVS must be reported to CBER, either as a prior approval supplement, CBE-30, or, with appropriate documentation, in the annual report. If the manufacturer has changed either the MVS or WVS since licensing or the previous inspection, the change should be reported to CBER in the appropriate manner. If a new viral seed was produced, there should be records describing the production of the new viral seed to assure that the viral seed was produced without deviations from the appropriate regulations and license requirements.

Storage

Maintenance of the MVS and the WVS under tight security is necessary, inasmuch as these items are an integral part of the production process. The viral seeds should be stored separately, in multiple locations, at the appropriate temperature, with adequate controls to prevent unauthorized access and loss of material due to equipment failure. The storage conditions, including temperature, should be clearly defined, validated, and documented. A working alarm system for each storage location is frequently seen.

Inventory

The firm must maintain an accurate inventory of all viral seed stocks, and each sample of viral seed must be clearly marked to indicate its contents. The inventory records should correlate to the amount of material on hand. The firm should maintain adequate control of WVS samples destined for use in production in order to assure protection of the samples and personnel safety.

Suitability of the WVS

The manufacturer should be able to provide data (e.g., titer, sterility) supporting the continued suitability of the current WVS for use in manufacture.

Bacterial Primary seeds and Secondary (Working) seeds Storage conditions

Maintenance of both the primary and the working seeds under tight security is necessary, as they are an integral part of the production process. Bacterial primary seeds should be stored separately, in multiple locations, at an appropriate temperature, with adequate controls to prevent unauthorized access and loss of material due to equipment failure. The storage conditions, including temperature, for the primary and secondary seeds should be clearly defined and documented. A working alarm system for each storage location is frequently seen.

Identification

The history and characteristics of each bacterial strain used in the manufacture of a product should be maintained. Characterization may include origin of the isolate, speciation, serotyping, biochemical testing, virulence, genetic characterization, and in-vivo animal or human testing. The primary and secondary seeds should meet specifications prior to use in production and appropriate records of characterization should be maintained. The manufacturer should have records to demonstrate which secondary seed lot is used to initiate a production batch.

Seed Integrity and Passage Limitation

In order to maintain genetic stability of the bacterial strain, the number of passages permitted for primary and secondary seeds are limited. The number of passages should be specified in an appropriate SOP based on the number of passages approved in the license application. Lot number and date of preparation should identify primary and secondary seed lots. Periodic tests should be performed in order to verify the integrity of the strain characteristics and freedom from contamination with extraneous organisms. Appropriate records should be maintained detailing the number of passages of each primary and secondary seed, and all tests performed to demonstrate strain integrity and freedom from contamination.

New Primary and Secondary Seeds

A change in a primary seed requires submission and approval of a supplement (prior approval supplement or PAS) prior to use of the primary seed in production. Establishment of new secondary seeds from a previously approved primary seed may be submitted to CBER as a CBE-30 supplement or in an annual report, provided that the change is made according to an SOP in the approved license application, unless otherwise specified.

2. Cell Banks

Master Cell Bank (MCB) and Working Cell Bank (WCB)

Cell bank systems are used for storage of some cell lines that are used as hosts for viral propagation. Both the MCB and WCB are qualified for manufacture during the licensing process. In most instances, a MCB is more extensively characterized than the WCB, although a manufacturer can be licensed for a product where the WCB is more extensively characterized than the MCB. In the latter case, the following comments for a MCB would be applied to the manufacturer's WCB.

Storage Conditions

The storage conditions for the MCB and WCB should be clearly defined. The MCB should be stored in more than one location, in the event that the MCB stored in one location is destroyed. Personnel access to both the MCB and WCB should be clearly specified and tightly controlled. Maintenance of the storage conditions should be assured. Storage requirements specifying temperature limitations, should document conditions and a working alarm system should be in place for temperature deviations from the established limits.

Identification

The cell bank should be well-characterized, and meet specifications prior to use in production. Any new WCB should be reported to CBER in the appropriate manner. If an approved procedure is in place, production of a new WCB according to the approved procedure may represent a minor change to be included in the annual report of minor manufacturing changes.

A cell bank that did not meet specifications should not be used. In the event this did occur there should be a record of an investigation, which includes a determination of how it happened, and the disposition of the lot(s) manufactured from the cell bank. The number of passages or doublings of a cell bank is controlled in order to assure genetic stability and, for attenuated vaccines, freedom from virulence. The number of permissible passages or doublings is product specific and will be specified in the firm's approved license application. The firm should have records identifying the passages and/or doublings of the MCB and WCB according to the procedures specified in the approved license application.

Handling of the Cell Bank

Storage, inventory, and handling of the MCB and the WCB should be adequate to protect the integrity of the cells with documentation to support. The firm should maintain records identifying the cell bank used to initiate a production batch and, if diploid cells are used for production, that the cells were utilized at the appropriate passage levels, as specified in the license.

Viral Safety Evaluation of Cell Banks

Because cell lines are derived from human or animal hosts, viral safety testing is often required in order to assure that the cell lines are free from contaminating viral agents. Viral contaminants may originate from the host cell itself (endogenous), or may be introduced into the cell line during production (non-endogenous).

Tests performed on the MCB or WCB to demonstrate the absence of adventitious agents are specified in the license application or approved supplements. For some products, each batch of production cells is also tested for possible viral contaminants that may have arisen during production.

New MCB and WCB

Establishment of a new MCB requires a license application or prior approval supplement. Establishment of a new WCB from a previously approved MCB may be reported in an annual report, provided that the WCB was generated in accordance with an SOP on file in an approved license application. A new WCB should be from an approved MCB. The testing of the new WCB should be performed in accordance with the SOP in the approved application or as submitted in a prior approval supplement.

3. Cell/Seed Expansion

Cell Culture

The process includes inoculation of the initial vessel with the starting materials and scale-up. Often the early passages are conducted in open vessels under laminar flow. The larger vessels are generally closed systems. There should be no breaks in connections between processing vessels in a closed system.

Fermentation/Bioreactors

The fermentation process includes inoculation of the initial vessel with the WCB and scale-up. Often the early passages are conducted in open vessels under laminar flow. The larger vessels are generally closed systems. There should be no breaks in connections between processing vessels in a closed system.

4. Viral Clearance

Products derived from cells or source material of human or animal origin, viral inactivation/removal should be performed in accordance with the process in the approved license application. In some manufacturing operations, there will be a specific viral inactivation/removal step; in other operations, viral inactivation/removal will be accomplished by a step or steps in the manufacturing process that are not specifically considered to be viral inactivation/removal steps. In some instances more than one viral clearance step is used for a given product.

There should be complete segregation of pre-and post-viral inactivation/removal steps (with the exception of products such as Albumin, which are virally inactivated in final containers). Separate areas with a dedicated air handling unit or single pass air should be used for those steps that occur after viral clearance procedures.

Heat treatment is one method of clearing infectious agents from biologicals. Heat treatment is sometimes referred to as pasteurization, and heating equipment such as large water baths, may be referred to as pasteurizers. Technically, however, pasteurization is heating at 63 degrees C for 30 minutes, which is not sufficient to render plasma derivatives virally inactive.

The parameters specified in the batch record should be achieved such that the validated process for viral inactivation/removal is accomplished. Changes made to the process, which do not require submission of a supplement to CBER, should be validated.

5. Inactivation

If the active ingredient is a killed or inactivated version of a live bacteria or virus, the methods for inactivation will have been established and reviewed during product approval. Either heat or chemical treatment may be used for inactivation. The manufacturer should have validated the process and followed the validated procedures during production. All parameters should be monitored and the appropriate testing is performed with acceptable results. The containment procedures should be adequate for the agent being inactivated. If the active ingredient is a bacterial toxin, methods of toxin inactivation will also have been established and reviewed during product approval. Treatment with formaldehyde is an example of toxin inactivation. As stated above the manufacturer should follow validated procedures for toxin inactivation, perform appropriate testing to demonstrate inactivation of the toxin, and obtain test results that are within the specifications approved in the license.

6. - 7. Disruption and Harvest

Disruption (when appropriate) and harvesting of the product is accomplished using chemical, physical, or enzymatic means. The firm should only be using their approved method(s) and all essential parameters should be documented.

8. Purification

Purification is generally performed using a combination of column chromatography, filtration and centrifugation. The method being used should be the same as the approved process and all steps should be documented in the batch record.

8a) Column or Batch Chromatography

Column or batch chromatography may be used for the purification of plasma derivatives, bacterial, viral and recombinant products. Conditions for collection of active material should be

well defined in batch records and correctly controlled so as to exclude unwanted material. Transfers should be made in an environmentally controlled system.

Column cleaning, rinsing, testing for process residuals, leaching from column media, and regeneration procedures are very important. These procedures must be validated and followed. There must be a defined and validated number of times a column may be re-used, and this limit must be followed.

Validation of production scale columns must be performed. This validation may be performed concurrently, and may be in progress. Columns not in use must be stored under conditions that inhibit microbial growth and prevent chemical or physical alteration of the medium. A system must be in place to monitor column performance, so that if the column begins to degrade or perform outside the validated parameters, it can be immediately replaced or regenerated, as specified by appropriate SOPs, and supported by process validation. Column support equipment such as UV monitors, pumps, chart recorders, PLCs, etc., should have appropriate installation qualification (IQ), and operational qualification (OQ). These should also be included in routine calibration schedules. Firms should document calibration, maintenance, replacement, and upgrades; these operations should be performed in accordance with SOPs.

8b) Centrifugation

Low-speed, high-speed, ultra-centrifugation or continuous flow centrifugation methods are commonly used in harvest and purification schemes. Centrifuge run time and speed (rpm), specific equipment number (if more than one option), and rotor used should be documented in the batch production record. Centrifuges should have appropriate equipment validation, IQ, OQ and performance qualification (PQ), and should be re-certified/calibrated on a regular basis to assure that the specified time and rpm produces the desired relative centrifugal force (rcf), to achieve adequate separation. Routine maintenance should include examining the rotors for wear. Rotors should be dedicated to the product or have a validated cleaning procedure. The centrifuge rotors as well as the inside of the centrifuge should have a validated cleaning process, as this technique commonly produces aerosols. The centrifugation step should have been included in the overall process validation, so that the stated time and speed reliably produce the desired separation. Any changes in the centrifugation equipment (new rotors, and especially a new centrifuge) should be in accordance with SOPs and documented. For example, 3200 rpm at 20 minutes in one brand of a centrifuge may not achieve the same rcf as the same time and speed in a similar-looking instrument from another manufacturer.

8c) Filtration

There are various types of filtration methods, such as diafiltration, ultrafiltration and microfiltration that may be used in the purification of vaccine products. Some of the filters used may be single-use and some may be multi-use. The filters are usually placed within a filter housing apparatus. The criteria used for the evaluation of the column purification should also be applied to the filter housings and the multi-use filters.

8d) Precipitation followed by Filtration or Centrifugation

Conditions for precipitation (time, temperature, concentration, etc.) should be based on process validation and be defined in the batch production record. Previous comments regarding filtration and centrifugation apply, as appropriate.

9. Formulation, Filling, and Packaging

For some biological drug products, the drug substance may be diluted, adsorbed with adjuvant, mixed with stabilizers, mixed with preservative, and/or lyophilized to become the final biological drug product. In addition, more than one component can be formulated together to produce a combination vaccine product.

10. Filtration

The sterilizing filters should be validated for product compatibility and microbial retention and that they are adequate for their intended use. The filters should be evaluated prior to use to determine if they meet specifications. Integrity testing should be performed on filters post-fill and results should be in keeping with the manufacturer's validated specifications. Some bulk products are held after sterile filtration prior to filling. The holding period and storage conditions should be validated.

11. Filling

If the duration of filling is lengthy, time limits should be established and validated to ensure that the duration of the fill does not affect the potency of the biological drug product and its susceptibility to microbial contamination. An SOP should be in place for interruptions in the fill, should it occur. Some products are held after sterile filtration prior to filling. The holding period and storage conditions should be validated. Filling lines should be inspected to ensure that carryover does not occur from previous fills.

12. Lyophilization

Loading of the lyophilizer should be done either under Class 100 (ISO 5) conditions, or as otherwise approved by CBER. The lyophilization process must be performed in accordance with validated parameters, including the placement of products in the lyophilizer.

If the vials are overlaid with gas (usually nitrogen) the firm's procedures for integrity testing of sterilizing filters, sterilization, and replacement, should be documented and followed.

13. Containers/Closures

There are several different final container and closure systems for biological drug products. Examples include capsules (blister packed), sachets, oral solutions, sealed glass ampules, single-dose syringes, single-dose and multi-dose vials (solutions or lyophilized), and multiple puncture devices pre-loaded with antigen. The firm should have adequate written specifications and procedures describing the receipt, handling, sampling, and storage of containers and closures, especially those that need to be sterile and/or pyrogen-free.

The firm should have procedures and controls used to verify and assure suitability of containers and closures, for accepting/rejecting final product containers and closures from the vendor, a validated container/closure system(s) and for the reconciliation of final containers.

The depyrogenation and sterilization procedures for biological drug product containers, closures, and components should be appropriately validated, and followed. Equipment used for these processes (stopper processors, tunnel sterilizers, ovens, autoclaves) should be properly maintained and re-qualified periodically.

14. Labeling/Packaging

Applicable labeling requirements are found in 21 CFR 201, as well as various sections of Parts 610 and 660. Specific wording for labeling is reviewed and approved by CBER. Biological drug products should be labeled as approved by CBER.

Process controls during labeling and packaging, such as inspection, label security, and label accountability, should be written and followed. Visual inspection should be performed in appropriate areas, and operators should be trained and certified in visual inspection procedures.

15. Aseptic/Controlled Process:

Biological drug products are manufactured in a controlled environment. The entire process does not have to be performed under aseptic conditions, but the firm should have established the point in the process where aseptic controls begin. Biological drug products should be maintained in a controlled environment throughout the process and have specified in-process bioburden action and alert limits for which the firm can provide a meaningful rationale.

a. *Aseptic processing from early manufacturing steps:*

Some biological drug products undergo aseptic processing at some or all manufacturing steps preceding the final product closing step. With some products, there is a point in the process after which a product can no longer be rendered sterile by filtration. In such cases, the product should be handled aseptically at all steps subsequent to filter sterilization. In other instances, the final biological drug product cannot be filter sterilized, and, therefore, each component in the formulation should be rendered sterile and mixed aseptically. For example: products containing aluminum adjuvant are formulated aseptically because once they are alum adsorbed, they cannot be sterile-filtered.

When a biological drug product is processed aseptically from the early stages, the product and all components or other additions are rendered sterile prior to entering the manufacturing process. It is critical that all transfers, transports, and storage stages be carefully controlled at each step of the process to maintain sterility of the product.

Procedures (e.g., aseptic connection) that expose a product or product contact surfaces must be performed under unidirectional airflow in a Class 100 (ISO 5) environment. The environment of the room surrounding the Class 100 (ISO 5) environment must be Class 10,000 (ISO 7) or better. Microbiological and airborne particle monitoring should be performed during operations.

Microbial surface monitoring should be performed at the end of operations, but prior to cleaning. Personnel monitoring should be performed in association with operations.

Process simulation studies should be designed to incorporate all conditions, product manipulations, and interventions that could impact on the sterility of the product during manufacturing. The process simulation, from the early process steps, should demonstrate that process controls are adequate to protect the product during manufacturing.

These studies should incorporate all product manipulations, additions, and procedures involving exposure of product contact surfaces to the environment. The studies should include worst-case conditions such as maximum duration of open operations and maximum number of participating operators. Process simulations do not need to mimic total manufacturing time if the manipulations that occur during manufacturing are adequately represented.

It is important that process simulations incorporate storage of product or transport to other manufacturing areas. For instance, there should be assurance of bulk vessel integrity for specified holding times. The transport of bulk tanks or other containers should be simulated as part of the media fill. Process simulation studies for the formulation stage should be performed at least twice per year.

For lyophilization operations, unsealed containers should be exposed to pressurization and partial evacuation of the chamber in a manner that simulates the process. Vials should not be frozen, as this may inhibit the growth of microorganisms.

b. Aseptic processing of cell-based therapy products (or of products intended for use as cell based therapies)

Cell-based therapy products represent a subset of the products for which aseptic manipulations are used throughout the process. Where possible, closed systems are used during manufacturing. Cell-based therapy products often have short processing times at each manufacturing stage, even for the final product. Often, these products are administered to patients before final product sterility testing results are available. In situations where results of final sterility testing are not available before the product is administered, additional controls and testing could be instituted. For example, additional sterility tests can be performed at intermediate stages of manufacture, especially after the last manipulation of the product prior to administration. Other tests that may indicate microbial contamination, such as microscopic examination, gram stains, and endotoxin testing should be performed prior to product release.

c. Manufacturing and aseptic processing

The manufacturer must meet their established microbial specifications for in process testing for the lots made. Observation of the aseptic processes should be made, when possible, to evaluate aseptic technique. All connections and transfers to manufacturing should be made in an aseptic manner.

An SOP should be in place for interruption of the fill, should it occur. Some bulk products are held after sterile filtration prior to filling. The holding period and storage conditions should have been validated. Procedures should be in place for limiting access to controlled and classified areas.

Filters should be evaluated prior to use to assure they meet specifications. Integrity testing should be performed on filters post-fill and results should be in keeping with manufacturers and validated specifications.

Cleaning and sanitization procedures for the aseptic core should be written and followed. These procedures should employ cleaning agents according to results of validation studies and surfaces should be monitored to demonstrate continued efficacy. For lengthy filling operations, time limits should be set and validated to assure that the duration of the fill does not affect the potency of the product and its susceptibility to microbial contamination.

There should be a program(s) in place for training operators. In addition to training in the manufacturing process, the operators should also be trained in proper gowning technique. Written procedures for gowning should be in place and followed.

The firm's aseptic processing areas (filling and lyophilization) should be designed using 21 CFR 211.42(c)(10), the Guideline on Sterile Drug Products Produced by Aseptic Processing, and the Draft Guidance for Industry – Sterile Drug Product Produced by Aseptic Processing – Current Good Manufacturing Practices as guides.

Class 100 (ISO 5) conditions must be validated and maintained in areas in which sterile product and components, including container/closure systems, are exposed. Monitoring critical and immediately surrounding clean areas as well as personnel should include routine identification of microorganisms to the species level.

ATTACHMENT 5

MINIMALLY MANIPULATED, UNRELATED ALLOGENEIC UMBILICAL CORD BLOOD (HEMATOPOIETIC PROGENITOR CELLS, CORD [HPC-C])

BACKGROUND

In 1997, a new regulatory framework was proposed for human cellular and tissue-based products, including hematopoietic stem/progenitor cells. The proposed framework provided a tiered approach to the regulation of human cellular and tissue-based products, now referred to as human cells, tissues, and cellular and tissue-based products (HCT/Ps). This approach was implemented by promulgating three final rules, which comprise 21 CFR Part 1271, and which became effective on May 25, 2005.

1. “Human Cells, Tissues, and Cellular and Tissue-Based Products; Establishment Registration and Listing” (66 FR 5447, January 19, 2001). This final rule requires establishments that manufacture HCT/Ps to register and list their products with the agency.
2. “Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products” (69 FR 29786, May 25, 2004). This final rule requires, with certain exceptions, that a donor eligibility determination be made based on the results of HCT/P donor screening and testing for relevant communicable disease agents and diseases.
3. “Current Good Tissue Practice for Manufacturers of Human Cells, Tissues, and Cellular and Tissue-Based Products; Inspection and Enforcement” (69 FR 68612, November 24, 2004). This final rule provides requirements for the methods used in, and the facilities and controls used for, the manufacture of HCT/Ps, including but not limited to all steps in recovery (collection), donor screening, donor testing, processing, storage, labeling, packaging, and distribution.

As described in the registration and listing final rule, FDA is regulating as biological drugs or devices, those HCT/Ps that:

- Are more than minimally manipulated (processing alters the biological characteristics of the cells);
- Are for a use other than homologous use as reflected by the labeling, advertising, or other indications of the manufacturer’s objective intent;
- Involve for their manufacture the combination of the cell or tissues with another article, excluding water, crystalloids, or a sterilizing, preserving, or storage agent that does not raise new clinical safety concerns with respect to the HCT/P; or

- Have a systemic effect or are dependent upon the metabolic activity of living cells for their primary function, and are not for:
 - Autologous use;
 - Allogeneic use in a first- or second-degree blood relative; or
 - Reproductive use.

In October 2009, the agency issued a guidance entitled “Minimally Manipulated, Unrelated Allogeneic Placental/Umbilical Cord Blood Intended for Hematopoietic Reconstitution for Specified Indications.” The guidance advised manufacturers that since HPC-C are considered to have a systemic effect, they are therefore being regulated as biological products and drugs under the Public Health Service (PHS) Act and the Federal Food, Drug, and Cosmetic Act (FDCA) when intended for hematopoietic reconstitution in patients with any of the following diseases:

- Hematological malignancies
- Certain lysosomal storage and peroxisomal enzyme deficiency disorders:
 - Hurler Syndrome (MPS I)
 - Krabbe Disease (Globoid Leukodystrophy)
 - X-linked Adrenoleukodystrophy
- Primary immunodeficiency diseases
- Bone marrow failure
- Beta thalassemia

The guidance was also intended to assist manufacturers in obtaining a biologics license for HPC-C, and contained information about the manufacture of the products and how to comply with applicable regulatory requirements.

The license would apply to all HPC-C manufactured after approval of the license application as well as HPC-C previously manufactured in accordance with the information provided in the license application, where documentation is provided to demonstrate their comparability. However, it is likely that there will be situations in which there will not be a licensed cord blood unit that provides an appropriate human leukocyte antigen (HLA) match for a patient in need and that an unlicensed cord blood unit may be the best match. Because each cord blood unit is unique and may be life-saving for a particular patient, it is important to facilitate the availability for transplantation of certain unlicensed cord blood units. Therefore, it is anticipated that use of such unlicensed HPC-C would be acceptable under an approved Investigational New Drug (IND) application.

APPLICABLE REGULATORY REQUIREMENTS

HPC-C’s and establishments involved in their manufacture are subject to all applicable regulatory requirements; and, when applying for a biologics license, this includes a prelicense inspection (42 U.S.C. § 262). Because HPC-Cs for unrelated allogeneic use are regulated as

drugs under the FDCA and as biological products under the PHS Act, the applicable regulations promulgated under these acts must be followed.

Regulations applicable to HPC-Cs include, but are not limited to, the following sections of the CFR:

- 21 CFR Parts 201, and 610 Subpart G – Labeling;
- 21 CFR Part 202 – Prescription Drug Advertising;
- 21 CFR Parts 210 and 211 – Current Good Manufacturing Practice Regulations (CGMP);
- 21 CFR Part 600 – Biological Products: General; and
- 21 CFR Part 610 – General Biological Products Standards.

Cord blood and HPC-Cs are considered HCT/Ps, defined in 21 CFR 1271.3(d). In the collection of cord blood and the manufacture of HPC-Cs, the regulations promulgated for HCT/Ps in 21 CFR Part 1271 apply. These regulations encompass registration and listing, donor eligibility, and good tissue practices. For the manufacture of HPC-Cs, in the event that a regulation in 21 CFR Part 1271 is in conflict with a requirement in 21 CFR Parts 210, 211, 600, or 610, the regulations more specifically applicable to an HPC-C will supersede the more general.

The Current Good Tissue Practice (CGTP) requirements govern the methods used in, and the facilities and controls used for, the manufacture of HCT/Ps to prevent the introduction, transmission, or spread of communicable diseases by HCT/Ps (21 CFR 1271.150(a)). Because cord blood and HPC-Cs are HCT/Ps, these provisions are applicable to both cord blood and HPC-Cs.

The CGMP requirements, in 21 CFR Parts 210 and 211, govern the methods to be used in, and the facilities or controls to be used for, the manufacture, processing, packing, or holding of a drug to ensure that such drug meets the requirements of the FDCA as to safety, has the identity and strength, and meets the quality and purity characteristics that it purports or is represented to possess. Due to the broader scope of these regulations, most of the CGMP regulations under 21 CFR Parts 210 and 211 would be applicable to HPC-Cs. Additionally, due to the broad scope of the regulations, for the most part, CGTP would be *subsumed* under the broader CGMP requirements. Compliance with these CGMP requirements would result in compliance with applicable CGTP requirements.

Section VII of the October 2009 cord blood guidance contains recommendations for application of the appropriate regulations for establishment registration and listing, and specific recommendations for manufacturing HPC-Cs. The section references the appropriate CGMP sections of the regulations that apply to biologic products. Also, a section from 21 CFR Part 1271 is referenced only when there is not a corresponding section in the CGMP requirements.

MATERIALS SYSTEM

Source Material

The source material for HPC-C is human placental/umbilical cord blood. The cord blood is collected immediately after birth at the site of delivery. Typically, the HPC-C manufacturer will provide a collection kit to be used by medical staff in accordance with approved procedures provided by the HPC-C manufacturer. In general, the kit will include detailed instructions, materials intended to clean the umbilical cord prior to venipuncture, a collection device, vials for

sample collection, labels, and a shipping container. The most common collection device is a blood bag containing anticoagulant with a needle attached.

Specific collection procedures will vary. In general, after the baby is born, the umbilical cord is clamped and cut. The surface of the umbilical cord attached to the placenta is cleaned. A sterile blood collection bag set with attached tubing and needle is used to puncture the cleaned surface of the umbilical cord to enter the umbilical vein. The cord blood drains through the tubing into the bag by gravity. After collection, the tubing attached to the blood bag is clamped/secured to prevent leakage, and the cord blood is held at room temperature while awaiting and during shipment to the HPC-C manufacturer.

DONOR ELIGIBILITY SYSTEM

The donor-eligibility determination

The donor-eligibility determination is a conclusion that a donor is either eligible or ineligible to donate cells or tissues to be used in an HCT/P, based on the results of donor screening (21 CFR 1271.75) and testing (21 CFR 1271.80 and 1271.85). Except in certain situations specified under 21 CFR 1271.60(d), 1271.65(b), and 1271.90, an HCT/P must not be implanted, transplanted, infused, or transferred until the donor has been determined to be eligible (21 CFR 1271.45(c)).

Under 21 CFR 1271.50(b), a donor is eligible only if:

- Screening shows that the donor is free from risk factors for, and clinical evidence of, infection due to relevant communicable disease agents and diseases, and is free from communicable disease risks associated with xenotransplantation; and
- Test results for relevant communicable disease agents are negative or nonreactive, except as provided in 21 CFR 1271.80(d)(1) for non-treponemal screening tests for syphilis.

In accordance with 21 CFR 1271.50(a), a “responsible person” must determine and document the eligibility of a cell or tissue donor. A responsible person is one who is authorized to perform designated functions for which he or she is trained and qualified (21 CFR 1271.3(t)). A responsible person should have appropriate medical training and adequate knowledge of relevant Federal regulations and guidances.

Relevant communicable disease agents or diseases (RCDADs)

There are two groups of relevant communicable disease agents or diseases. The first group consists of those communicable diseases and disease agents specifically listed in 21 CFR 1271.3(r)(1). The second group consists of communicable disease agents or diseases described under 21 CFR 1271.3(r)(2), that are not specifically listed in 21 CFR 1271.3(r)(1). These two groups are as follows:

- Relevant communicable disease agents or diseases specifically listed:
 - Human immunodeficiency virus (HIV), types 1 and 2;
 - Hepatitis B virus (HBV);
 - Hepatitis C virus (HCV);
 - Human transmissible spongiform encephalopathy (TSE); including Creutzfeldt-Jakob disease (CJD); and

- *Treponema pallidum* (syphilis).
- In addition, the following cell-associated communicable disease or disease agents are relevant for viable, leukocyte-rich cells and tissues, including HPC-C:
 1. Human T-lymphotropic virus (HTLV), types I and II.
- Communicable disease agents or diseases meeting the criteria described in 21 CFR 1271.3(r)(2), but not specifically listed in 21 CFR 1271.3(r)(1):
 - West Nile Virus (WNV)
 - Sepsis
 - Vaccinia

Procedures

Procedures must be established and maintained for all steps performed in testing, screening, determining donor eligibility, and complying with all other requirements of part 1271, subpart C (21 CFR 1271.47(a)). A responsible person must review and approve all procedures before their implementation (21 CFR 1271.47(b)). These procedures must be readily available to personnel in the area where the procedures are performed, or if this is not practical, in a nearby area (21 CFR 1271.47(c)).

Under 21 CFR 1271.47(d), an HPC-C establishment must record and justify a departure from a procedure relevant to preventing risks of communicable disease transmission. Before distributing an HCT/P manufactured under a departure from a procedure, a responsible person must determine that the departure did not increase the risk of communicable disease transmission. A departure is considered to be an intended change from an established procedure, which occurs before the HCT/P is distributed, and is consistent with applicable regulations and standards.

Record retention

Under 21 CFR 1271.55(d)(1), records of results and interpretation of all testing for relevant communicable disease agents and screening for communicable diseases, the name and address of the testing laboratory, and the donor eligibility determination, including the name of the responsible person who made the donor eligibility determination, and the date of the determination must be retained.

Under 21 CFR 1271.55(d)(4), records must be retained pertaining to a particular HCT/P for at least 10 years after the date of its administration. This includes records created by laboratories performing donor eligibility testing (21 CFR 1271.55(d)). If the date of administration is not known, then records must be retained at least 10 years after the date of distribution, disposition, or expiration, whichever is latest (21 CFR 1271.55(d)(4)). Testing laboratories that are not aware of the date of administration, distribution, disposition or expiration, should retain records for at least 10 years after the record was created (i.e., after the testing was performed).

Quarantine

Before the completion of the donor-eligibility determination, an HCT/P must be kept in quarantine and clearly identified as in quarantine (21 CFR 1271.60(a) and (b)). The quarantined HCT/P must be easily distinguishable from HCT/Ps that are available for release and distribution (21 CFR 1271.60(b)).

Quarantine means the storage or identification of an HCT/P, to prevent improper release, in a physically separate area clearly identified for such use, or through use of other procedures, such as automated designation (21 CFR 1271.3(q)). An example of automated designation is the use of a validated computer system to maintain information on bar-code-labeled HCT/Ps held in a liquid nitrogen freezer. When the HCT/P is released, the computer system is activated to assure identification and retrieval of the specific HCT/P for the intended recipient.

HCT/Ps may be shipped before completion of the donor-eligibility determination (21 CFR 1271.60(c)). However, the HCT/P must be kept in quarantine and must be accompanied by records that:

- Identify the donor (e.g., by a distinct identification code affixed to the container);
- State that the donor-eligibility determination is not complete; and
- State that the HCT/P must not be implanted, transplanted, infused, or transferred until the donor-eligibility determination is complete, except in cases of urgent medical need under 21 CFR 1271.60(d).

Storage of HCT/Ps from a donor who has been determined to be ineligible

Under 21 CFR 1271.65(a), HCT/Ps from an ineligible donor must be stored or identified in a physically separate area clearly identified for such use, or follow other procedures that are adequate to prevent improper release, until the HCT/Ps are destroyed or distributed for use in certain limited circumstances identified in 21 CFR 1271.65 (b) and (c). Examples of ways in which establishments may comply with this requirement, include employing separate refrigerators or freezers, using separate shelves in a single refrigerator or freezer, and using an automated designation system.

Donor Screening

Under 21 CFR 1271.75(a), a cell and tissue donor must be screened by reviewing relevant medical records for risk factors for, and clinical evidence of, relevant communicable disease agents and diseases; and communicable disease risks associated with xenotransplantation.

Sources of information to review

When a potential donor is screened, “relevant medical records” must be reviewed for risk factors for, and clinical evidence of, the relevant communicable diseases. Relevant medical records, as defined under 21 CFR 1271.3(s), means a collection of documents that includes: (1) a current donor medical history interview; (2) a current report of the physical assessment of a cadaveric donor or the physical examination of a living donor; and (3) other available records listed in 21 CFR 1271.3(s)(1) through (4).

1. The donor medical history interview (21 CFR 1271.3(n)) is a documented dialogue concerning the donor's medical history and relevant social behavior.

The medical history interview may take place in person or by telephone. Since a donor medical history interview is a documented dialog (21 CFR 1271.3(n)), if a donor medical history questionnaire is self-administered, the interviewer should review and verify the answers with the individual who has filled out the questionnaire form.

2. The purpose of the physical assessment/physical examination is to assess for physical signs of a relevant communicable disease and for signs suggestive of any risk factor for such a disease. For living donors, only those parts of the body that are necessary to evaluate for RCDADs need to be examined based upon relevant donor history that has been obtained during the interview and review of available records. Records of a recent report of a physical examination by other health care professionals may be used.
3. If they are available, the following other records also meet the definition of relevant medical records (21 CFR 1271.3(s)).
 - Laboratory test results (other than the results of testing required for the donor-eligibility determination);
 - Medical records;
 - Coroner and autopsy reports; and
 - Records or other information received from any source pertaining to risk factors for relevant communicable disease (e.g., social behavior, clinical signs and symptoms of relevant communicable disease, and treatments related to medical conditions suggestive of risk for relevant communicable disease). Examples of these records include: medical examiner reports, police records, and information from other tissue or medical establishments, if applicable.

Screening a donor who is one month of age or younger

Under 21 CFR 1271.75, all donors must be screened, including infant donors one month of age or less. Since a donor who is one month of age or younger cannot participate in the donor medical history interview, another individual must be interviewed that is able to provide the information sought in the interview (21 CFR 1271.3(n)(2)).

The birth mother should also be screened when an infant is one month of age or less, as in the case of HPC-C. Donor screening of the birth mother should involve a donor medical history interview and review of available medical records; the physical examination or physical assessment of the birth mother is recommended when practical.

Donor Testing

Laboratory requirements

1. Under 21 CFR 1271.1, laboratories must be registered with FDA.
2. Under 21 CFR 1271.80(c):
 - Appropriate FDA licensed, approved or cleared donor screening tests must be used in accordance with the manufacturer's instructions. However, as there are currently no FDA licensed, approved, or cleared donor screening tests for Chlamydia trachomatis and Neisseria gonorrhoea, FDA-licensed, approved, or cleared diagnostic tests labeled for the detection of these organisms in an asymptomatic, low-prevalence population must be used. In some instances, laboratories may need to conduct more than one test to adequately and appropriately test for a single communicable disease agent or disease. For example, to test for HIV-1, it is appropriate to use a test that detects viral nucleic acid (e.g., a nucleic acid test) and a test that detects antibody to HIV-1 (e.g., an enzyme immunoassay). If HIV-1 infection is present, each test may be reactive at different times during the course of the disease.

- Laboratories must be certified to perform such testing on human specimens either under the Clinical Laboratory Improvement Amendments (CLIA) or meet equivalent requirements as determined by the Centers for Medicare and Medicaid Services. Examples of the latter include laboratories that have been accredited by accrediting organizations approved by CMS. Certain states are exempt under CLIA because CMS has found their state programs to be in compliance with CLIA standards.
3. Under 21 CFR 1271.55(d), laboratories must maintain documentation of results and interpretation of all testing for at least 10 years.

Specimen collection in a donor that is one month of age or younger

If a donor is one month of age or younger, a specimen must be collected and tested from the birth mother instead of the donor (21 CFR 1271.80(a)). The specimen for testing from the birth mother must be collected within seven days before or after collection of the HPC-C (21 CFR 1271.80(b)). Although there is no requirement that specifies when to test the collected specimen, testing should be performed as soon as possible after collection and in accordance with the time limits stated in the manufacturer's instructions for use of the test kit. If a specimen from the birth mother of a donor one month of age or younger is unavailable, the donor is ineligible.

Diseases to test; Tests to be used

Donors must be tested for the following diseases, as required in 21 CFR 1271.85(a). The tests listed are viewed to adequately and appropriately reduce the risk of transmission of relevant communicable disease.

- HIV, type 1 (FDA-licensed screening test either for anti-HIV-1 or combination test for anti-HIV-1 and anti-HIV-2; and FDA-licensed screening NAT test for HIV-1, or combination NAT);
- HIV, type 2 (FDA-licensed screening test either for anti-HIV-2 or combination test for anti-HIV-1 and anti-HIV-2);
- HBV (FDA-licensed screening test for Hepatitis B surface antigen (HBsAg) and for total antibody to Hepatitis B core antigen (anti-HBc)(IgG and IgM);
- HCV (FDA-licensed screening test for anti-HCV; and FDA-licensed screening NAT test for HCV, or combination NAT); and
- *Treponema pallidum* (FDA-cleared screening test for syphilis or FDA-cleared diagnostic serologic test for syphilis).

As an exception for syphilis test results under 21 CFR 1271.80(d)(1), a donor may be determined to be eligible whose specimen tests positive or reactive on a non-treponemal screening test for syphilis and negative or nonreactive on a specific treponemal confirmatory test (e.g., fluorescent treponemal antibody with absorption test (FTA-ABS)), so long as all other required testing and screening are negative or nonreactive. A donor whose specimen tests positive or reactive on either a specific treponemal confirmatory test for syphilis or on a treponemal screening test is not eligible.

Donors of viable, leukocyte-rich cells or tissue such as HPC-C must also be tested for the following diseases, in addition to those above (21 CFR 1271.85(b)):

- Human T-lymphotropic virus, types I and II (FDA-licensed screening test for anti-HTLV I/II); and
- Cytomegalovirus (FDA-cleared screening test for anti-CMV) (total IgG and IgM).

NOTE: CMV is not a relevant communicable disease agent or disease. However, establishments are required to test donors of viable, leukocyte-rich cells or tissues for CMV. A donor who tests positive or reactive for CMV (total antibody) is not necessarily ineligible to donate HCT/Ps. Procedures must be established and maintained regarding donors whose specimens test positive or reactive for CMV (21 CFR 1271.85(b)(2)). Establishments should include procedures in their SOPs for communicating test results of donors who are positive or reactive for CMV antibody (total).

The following CBER Internet pages have additional information on HCT/P donor testing:

[Testing HCT/P Donors; Specific Requirements](#), and

[Currently Available Screening Tests for HCT/P Donors](#)

Use of HPC-C before the donor eligibility determination is completed

The use of cells or tissues from a donor before the donor eligibility determination is completed, is not prohibited under 21 CFR 1271.60(d) if there is a documented urgent medical need. An urgent medical need means that no comparable HCT/P is available and the recipient is likely to suffer death or serious morbidity without the HCT/P (21 CFR 1271.3(u)). However, the following requirements apply under 21 CFR 1271.60(d)(2) through (4):

1. If an HCT/P is made available based on a physician's request for urgent medical need before completing the donor-eligibility determination, the urgent medical need must be documented and the HCT/P labeled prominently: "NOT EVALUATED FOR INFECTIOUS SUBSTANCES," and "WARNING: Advise patient of communicable disease risk."
2. The HCT/P must be accompanied by a statement of: (a) the results of any required donor screening that has been completed; (b) the results of any required testing that has been completed; and (c) a list of any required screening and testing that has not yet been completed.
3. The manufacturer of the HCT/P must document that the physician using the HCT/P was notified that the testing and screening were not complete.
4. The manufacturer must complete the donor-eligibility determination during or after the emergency use of the HCT/P, and inform the physician of the results of the determination.

Use of HPC-C from an ineligible donor

Under 21 CFR 1271.65(b), an HCT/P from an ineligible donor, based on required testing and/or screening results, is not prohibited from use for implantation, transplantation, or transfer in the following three circumstances:

1. The HCT/P is for allogeneic use in a first-degree or second-degree blood relative;
 2. The HCT/P consists of reproductive cells or tissue from a directed reproductive donor; or
 3. There is an urgent medical need for the HCT/P based upon a physician's request documented by the establishment.
- An HCT/P made available under these provisions from an otherwise ineligible donor must be labeled prominently with the Biohazard legend (21 CFR 1271.3(h)) and with the statement "WARNING: Advise patient of communicable disease risk," and, in the case of reactive or positive test results, "WARNING: Reactive test results for (name of disease agent or disease)" (21 CFR 1271.65(b)(2)). Moreover, the manufacturer of the HCT/P must document that they notified the physician using the HCT/P of the results of screening and testing (21 CFR 1271.65(b)(3)).

LABORATORY CONTROL SYSTEM

Availability for Distribution and Testing and Release for Distribution

An establishment must not make available for distribution an HPC-C that is in quarantine, is contaminated, is recovered from a donor who has been determined to be ineligible or for whom a donor-eligibility determination has not been completed (except as provided under 21 CFR 1271.60, 1271.65, and 1271.90), or that otherwise does not meet release criteria designed to prevent communicable disease transmission (21 CFR 1271.265(c)(2)). For each lot of HPC-Cs, there must be appropriate laboratory determination of satisfactory conformance to final specifications (21 CFR 211.165).

Results of release testing on HPC-Cs must meet established specifications or acceptance criteria before the unit is released for patient administration (21 CFR 211.165(d), 1271.265(c), and 1271.50(a)).

Product Safety Testing (21 CFR 610.11 and 21 CFR 1271, Subpart C)

Infectious Disease Testing

In addition to the relevant communicable disease testing requirements detailed in the Donor Eligibility section above, sterility testing must be performed as specified in 21 CFR 610.12 or with an equivalent method that has been validated or verified for use (21 CFR 610.9). Sterility testing should be performed on a sample of the HPC-C taken before cryopreservation, either before or after addition of the cryoprotectant.

An HPC-C for transplantation that fails sterility testing must not be released (21 CFR 1271.265(c)(2), and 21 CFR 211.165(f)).

Hemoglobin Testing

Hemoglobin screening results should be performed that indicate whether an HPC-C donor expresses a homozygous hemoglobinopathy. HPC-C should not be released for transplantation with this abnormality.

Product Potency Testing (21 CFR 610.10)

Total Nucleated Cells

The total number of nucleated cells in the HPC-C should be adequate to provide, after thawing, at least 1.7×10^7 nucleated cells/kg of body weight of the prospective recipient; and

Because the weight of the prospective recipient is unknown at the time of storage, it is recommended that HPC-Cs contain at least 5.0×10^8 total nucleated cells per product.

Viable Nucleated Cells

A validated assay should be used to demonstrate that at least 85% of the nucleated cells in the HPC-C are viable after volume reduction and before cryopreservation.

Viable CD34+ Cells

The percent of viable nucleated cells expressing the hematopoietic progenitor cell marker CD34+ in a normal HPC-C should be at least 0.25% of the total viable nucleated cell content after volume reduction and before cryopreservation.

Product Identity Testing (21 CFR 610.14)

Histocompatibility Testing

Typing Methods – HPC-Cs should be typed by serologic or DNA-based methods for Human Leukocyte Antigen (HLA) Class I (A and B) loci, and by DNA-based methods for HLA Class II (DRB1) loci. A precryopreservation sample should be used for the initial HLA typing if serologic methods are used.

HLA Confirmatory Testing of Potential Recipient – Prior to releasing an HPC-C for transplantation, a manufacturer should obtain or perform confirmatory HLA typing of the potential recipient's blood, unless this typing has been confirmed and updated on an independent sample by the original laboratory or by an independent HLA laboratory.

HLA Confirmatory Testing of HPC-Cs – Once an HPC-C is identified for potential use, a sample of that unit should be tested to confirm the HLA type using a contiguous segment. The confirmatory testing record should include a list of the alleles tested and methodology used.

Blood Grouping and Rh Typing

The ABO group and Rh type of the HPC-C should be identified and recorded.

PRODUCTION SYSTEM

Upon receipt by the HPC-C manufacturer, the cord blood is processed. Samples are tested for hemoglobin, total nucleated cells, CD34+ cells, and ABO/Rh and HLA type. Processing methods vary, but in general involve a series of steps to remove excess red blood cells and

plasma, and freeze the HPC-C at a controlled rate for ultimate storage in the vapor or liquid phase of a liquid nitrogen freezer. Centrifugation is normally used to separate the red blood cells and plasma from the cellular layer containing the HPC-C. In some cases, a starch solution (e.g., Hespan) is added prior to centrifugation to facilitate red blood cell sedimentation. After the HPC-C have been isolated, Dimethylsulfoxide (DMSO) or another cryoprotectant is routinely added. DMSO is a cryoprotectant that prevents ice crystals from forming and destroying the cells during freezing and when the unit is thawed. Sterility testing should be performed on a sample of the HPC-C taken before cryopreservation.

Processing may be performed manually, with manufacturing personnel using syringes to add reagents to the blood bag containing the cord blood/HPC-C, or in a more automated fashion using a cord blood processing system and storage container, a device intended for use in the processing and the storage of cord blood. This device is a functionally closed processing system that includes containers, other soft goods, and a centrifugation system for cord blood concentration, and a final container for the cryopreservation and the storage of a cord blood product.

Regardless of the processing methods used, establishments should validate the processes used to manufacture HPC-Cs and establish in-process controls and final product specifications to ensure that HPC-Cs have the identity, strength, quality, and purity necessary for the products to be safe and effective. Whenever an established, validated procedure is modified, new validation studies should be performed. Because HPC-Cs are subject to microbiological contamination, procedures should be in place to ensure that sterility of the product is maintained.

Recommendations to HPC-C manufacturers concerning production and process control include :

- Manipulation of the cord blood should be restricted to volume reduction by depletion of red cells and plasma, followed by cryopreservation by controlled rate freezing or an alternative validated technique;
- An aseptic method of reducing cord blood volume should be used known to preserve viability and potency and to allow acceptable recovery of the original number of hematopoietic progenitor cells;
- Cryopreservation SOPs should specify the cryoprotectant to be used and its final concentration, as well as the nucleated cell concentration, method of freezing, endpoint temperature of cooling, cooling rate, and storage temperature;
- Use of a cryopreservation process validated to preserve potency and to permit recovery of at least 70% of the viable nucleated cells present in the product before cryopreservation; and
- Development of a thawing process demonstrated to permit recovery of at least 70% of the viable nucleated cells present in the product before freezing.

Acceptable temperature limits must be established for storage of HPC-C at each step in the manufacturing process to inhibit the growth of infectious agents. Storage temperatures must be maintained and recorded. Recorded temperatures must be periodically reviewed to ensure that HPC-C storage temperatures are consistently within acceptable limits (21 CFR 1271.260(e)).

PACKAGING AND LABELING SYSTEM

Accompanying records

Under 21 CFR 1271.55(a) the following records must be provided with each HCT/P, after the donor-eligibility determination has been completed:

- A distinct identification code (such as an alphanumeric code) affixed to the HCT/P container, that relates the HCT/P to the donor and to all records pertaining to the HCT/P and, except in the case of autologous donations, directed reproductive donations, or donations made by first-degree or second-degree blood relatives, does not include an individual's name, social security number, or medical record number;
- A statement whether, based on the results of screening and testing, the donor is determined to be eligible or ineligible; and
- A summary of the records used to make the donor-eligibility determination.

Under 21 CFR 1271.55(b), the summary of records in 21 CFR 1271.55(a)(3) must include:

- A statement that the communicable disease testing was performed by a laboratory or laboratories: (1) certified to perform such testing on human specimens under the Clinical Laboratory Improvement Amendments of 1988 (42 U.S.C. 263a) and 42 CFR part 493; or (2) meeting equivalent requirements, as determined by the Centers for Medicare and Medicaid Services (CMS);
- A listing and interpretation of the results of all tests performed for communicable disease agents or diseases, and, if applicable, for CMV (21 CFR 1271.85(b)(2));
- The name and address of the establishment that made the donor-eligibility determination; and
- A statement noting the reason for the determination of ineligibility in the case of an HCT/P from a donor who is ineligible based on screening and released under 21 CFR 1271.65(b).

The records referenced must accompany an HCT/P when it is placed into distribution. Electronic access to accompanying records within a facility would satisfy the regulatory requirements under 21 CFR 1271.55(a), as long as they are in compliance with 21 CFR 1271.55(c) – deletion of personal information.

Packaging and Shipping

Packaging and shipping containers must be designed and constructed to protect the HPC-C from contamination and other harmful effects of environmental exposure.

Appropriate shipping conditions must be established to be maintained during transit (21 CFR 1271.265(d)). Cryopreserved HPC-Cs should be transported in a liquid nitrogen-cooled dry shipper validated to maintain temperature for the appropriate time period.

Tracking System

An establishment that performs any step in the manufacture of an HPC-C in which the HPC-C is handled must track each such HPC-C in accordance with 21 CFR 1271.290, to facilitate the investigation of actual or suspected transmission of communicable disease and take appropriate

and timely corrective action. The system of tracking must enable the tracking of all HPC-Cs from:

- The donor to the consignee or final disposition (21 CFR 1271.290(b)(1)(i)); and
- The consignee or final disposition to the donor (21 CFR 1271.290(b)(1)(ii)).

Alternatively, if an establishment performs some but not all of the steps in the manufacture of an HPC-C in which the product is handled, they may participate in a system of tracking established and maintained by another establishment responsible for other steps in the manufacture of the same HPC-C, provided that the tracking system complies with all the requirements of 21 CFR 1271.290.

As part of the tracking system, each HPC-C manufactured must be assigned and labeled with a distinct identification code (e.g., alphanumeric) that relates the HPC-C to the donor and to all records pertaining to the HPC-C. This labeling must include information designed to facilitate effective tracking, using the distinct identification code, from the donor to the recipient and from the recipient to the donor. Except in the case of autologous or directed donations, such a code must be created specifically for tracking, and it may not include an individual's name, social security number, or medical record number. An establishment may adopt a distinct identification code assigned by another establishment engaged in the manufacturing process, or a new code may be assigned. If a new code is assigned to an HPC-C, procedures must be established and maintained for relating the new code to the old code (21 CFR 1271.290(c)).

As part of the tracking system, the manufacturer must establish and maintain a method for recording the distinct identification code and type of each HPC-C distributed to a consignee to enable tracking from the consignee to the donor (21 CFR 1271.290(d)). In addition, a method must be established and maintained for documenting the disposition of each HPC-C, to enable tracking from the donor to the consignee or final disposition. The information maintained must permit the prompt identification of the consignee of the HPC-C, if any (21 CFR 1271.290(e)).

At or before the time of distribution of an HPC-C to a consignee, the consignee must be informed in writing of the requirements in 21 CFR 1271.290 and of the tracking system that has been established to comply with the regulations (21 CFR 1271.290(f)).

ATTACHMENT 6

PRE-LICENSE AND PRE-APPROVAL INSPECTIONS

BACKGROUND

Section 351 of the Public Health Service Act and section 704 of the Federal Food, Drug and Cosmetic Act provide the regulatory authority to conduct inspections at any establishment where biological products are manufactured. Under 21 CFR 601.20, a biologics license shall not be issued except upon a determination that the product and establishment comply with the applicable regulations. Under the reauthorization of Prescription Drug User Fees in the Food and Drug Administration Modernization Act of 1997, an inspection, if needed, is considered to be part of the complete review of an application.

A pre-license inspection (PLI) or pre-approval inspection (PAI) is performed at establishments named in a biologics license application or supplement to ensure compliance with applicable requirements and to ensure that the data submitted are accurate and complete. This program directs CBER in the evaluation of biological drug establishments by on-site inspections when the firm submits a BLA or a prior approval supplement. This may include original submissions, Chemistry, Manufacturing, and Controls (CMC) amendments to pending original submissions, and CMC supplements to approved BLAs. Domestic and international PLIs and PAIs may cover all establishments associated with the submission, including the drug substance, finished dosage product manufacturing, and control testing laboratories.

The CMC section of an application or supplement includes the analytical test methods and specifications for drug intermediates, drug substances, and drug product, and general description of the product's manufacturing and control procedures as well as facility controls for traditional BLAs. Sections in the BLA including facility and equipment information, batch records, and other information can be verified on inspection. The assessment of CMC and other sections always includes a review of information submitted in the application or supplement and generally includes an inspection of manufacturing operations by the Division of Manufacturing and Product Quality in CBER's Office of Compliance and Biologics Quality and a product specialist. Team Biologics investigators are also invited to participate in the inspection.

CBER's policy is to ensure that manufacturing establishments and processes meet the appropriate requirements and comply with the regulations through inspections and review. CBER will determine if a PLI or PAI is necessary based on CBER SOPP 8410 "Determining When Pre-License or Pre-Approval Inspections Are Necessary." The scope of the inspections will be based on the systems approach described in this Compliance Program in addition to specific areas described in this Attachment.

INSPECTION SCHEDULING AND PREPARATION

A PLI or PAI should be performed based on when the establishment is in operation, inspection team availability, and to meet PDUFA timeframes. It may be combined with other inspection programs.

The preparation before a PLI or PAI should involve the following:

- Review the CMC section or other sections of the application or supplement and any related DMFs for the establishments to be inspected.
- Identify any issue/deviation that needs to be evaluated in more detail while on-site.
- Develop, with the other team members, an inspection plan and strategy specific to the establishment and product being inspected that is consistent with this program's objectives.

INSPECTION TEAM

PLIs and PAIs should be, whenever possible, a team approach with a DMPQ inspector as the team lead and a product specialist (for all inspections, except for final biological drug product facilities). CBER requests ORA participation in CBER PLIs and PAIs. Staff conducting these inspections will be qualified by appropriate training and experience.

CONDUCTING THE INSPECTION

The PLIs and PAIs should be performed using the systems-based approach, covering all systems (if applicable) and the three critical elements for each system, the equivalent of a Level I inspection. In addition, and as part of the systems-based approach to these types of inspections, the following objectives should also be assessed based on the inspection plan:

- Verify that all relevant data were submitted to the BLA or supplement, and data are accurate and complete.
- Verify that the manufacturing history is accurate and complete when compared to the submission.
- Observe the processes, manufacturing and testing, and compare with the description and/or batch record submitted in the CMC section and other sections of the submission.
- Review product process, process controls, analytical testing, and process validation for the drug substance and drug product.
- Review facility and process changes not covered in the submission that could affect the product or manufacturing.
- Review product development data if submitted in the application.
- Review batches or lots that did not meet and met specifications and verify out of specification investigations are completed.
- Review stability data and verify it meets specifications.
- Review data as needed, determined by submission review for qualification of new manufacturing areas, equipment, and utilities.
- Verify raw materials and components testing have been performed.
- Verify the new product has been incorporated into all aspects of the quality system.
- Review shipping validation for drug substance and drug product.
- Verify procedures have been established for reporting of Biological Product Deviation Reports and Adverse Experience Reports (21 CFR 600.14 and 600.80, respectively).

INSPECTION REPORTING

Any reportable inspectional observations will be issued to the establishment on a Form FDA-483 consistent with instructions in the IOM. Use the CBER/OCBQ/DMPQ address and phone

number as the district office address on the Form FDA-483. The address is:
FDA/CBER/OCBQ/DMPQ HFM-670, 1401 Rockville Pike, Rockville, MD 20852-1448, phone
301-827-3031.

After the inspection is conducted, communications with the applicant's authorized official or other authorized personnel should be documented. These communications, including telecons, are entered into RMS-BLA and uploaded to the EDR as part of the application or supplement under review. Official correspondence regarding the inspection and Form FDA-483 responses submitted by the applicant are added as amendments to the application or supplement under review.

The inspection team lead will coordinate with the team concerning the specific establishment inspection report (EIR) sections that each is responsible for writing. The EIR should be written shortly upon return from the inspection, as the application and/or supplement is under a predetermined review time clock that FDA is required to meet. All inspectional findings reported on the Form FDA-483 should be resolved prior to the approval of the application or supplement.