



DEPARTMENT OF THE ARMY  
WALLA WALLA DISTRICT, CORPS OF ENGINEERS  
WALLA WALLA, WASHINGTON 99362-9265

9208200

September 21, 1992

REPLY TO  
ATTENTION OF:

Hanford Program Office

Serial Letter 92PM085

Subject: Task Order DE-AT06-90RL12103 Under Master Interagency Agreement No. DE-AI06-90RL12074; 1100-EM-1 Operable Unit Remedial Investigation/Feasibility Study; Survey and Mapping Technical Specification.

Mr. R. D. Izatt, Acting Director  
Environmental Restoration Division  
U.S. Department of Energy Field Office, Richland  
P.O. Box 550, MSIN A5-19  
Richland, WA 99352



Dear Mr. Izatt:

This letter transmits for your information and use the Technical Specifications for USACE Survey and Mapping Activities, 1100 Area, Hanford Site. The document is the result of many meetings and much discussion over the last several months. An USACE Memorandum for Record is also enclosed documenting the comments received from the U.S. Department of Energy Field Office, Richland, the U.S. Environmental Protection Agency, the Washington State Department of Ecology, and the Westinghouse Hanford Company.

If you have any questions, or need further information, please contact me at 509-376-9101, or Arthur Bennett at 509-522-6639.

Sincerely,

*John T. Stewart*  
John T. Stewart, P.E.  
Project Manager, 1100-EM-1 O.U.  
Hanford Program Office

Enclosures

Copies Furnished:

- J. K. Erickson, DOE-RL
- R. D. Freeberg, DOE-RL
- N. A. Werdel, DOE-RL
- R. D. Larson, DOE-RL
- R. K. Stewart, DOE-RL
- D. R. Einan, EPA
- W. W. Staubitz, USGS
- R. B. Hibbard, Ecology
- J. P. Denkers, Ecology
- ~~Diets, WHC~~



Administrative Record - 1100-EM-1 (copies provided by WHC)

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19 May 1992

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**TECHNICAL SPECIFICATIONS  
FOR USACE SURVEY AND MAPPING ACTIVITIES  
1100 AREA  
HANFORD SITE**

REVISED 15 September 1992

50001

**Policy Statement:**

**The intended use of this document is to provide technical guidance and establish procedural and quality assurance guidelines for use by USACE during preparation of mapping and related products, as directed by DOE.**

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**1.0 General.** The U.S. Army Corps of Engineers (USACE) shall perform various professional services required to provide mapping of an area in the vicinity of the 1100 areas on the Hanford Reservation. Products to be generated as a result of this work tasking are as follows:

- a. Control for purpose of photogrammetric mapping.
- b. Stereo paired photography covering an area known as the 300 and 1100 Area, Hanford Site.
- c. Digitally prepared mapping of the same area.
- d. ARC/INFO file formats of digital mapped area.
- e. Orthophotography of same area to accompany mapping.
- f. Other supporting items which will be retained by USACE, which form a part of this tasking.

**2.0 Surveying.**

**2.1 Datum.**

2.1.1 All horizontal control stations shall be referenced to the Washington State Plane Coordinate System of 1983, South Zone (WCS83S) as defined in chapter 58.20 RCW, and in the North American Datum of 1983 (latest adjustment) (NAD83). Horizontal coordinates in the WCS83S shall be expressed as northing and easting in meters and reported to three decimal places.

2.1.2 Elevations shall be referenced to the North American Vertical Datum of 1988 (NAVD88). Elevations of control stations shall be expressed in meters and reported to three decimal places.

**2.2 Primary Survey Control.**

2.2.1 The National Geodetic Survey (NGS) published horizontal coordinates for control stations in the NAD83 reference systems. These control stations and their published values shall be the primary horizontal control upon which all other horizontal control surveys shall be based. The minimum classification shall be Second Order, Class I. All control coordinates will be recorded electronically and managed for other future site activities.

2.2.2 Likewise, for vertical control, the NGS published elevations for vertical control stations (benchmarks) shall be used. These benchmarks shall provide the primary vertical control upon which all other vertical control surveys shall be based. The minimum classification shall be Third Order. All control coordinates will be recorded electronically and managed for other future site activities.

**2.3 Secondary Survey Control.**

2.3.1 Additional control stations shall be established to supplement the primary survey control, as necessary, to perform stereo compilation to the requested map scale and contour interval. Extraneous control points that provide little or no production value shall not be established. Control stations may serve as both horizontal and vertical control points.

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2.3.2 Monuments for secondary control stations shall be stable and as permanent as practical, shall extend below the frost line and shall have a metal disk which shall be stamped with a station identifier. There are many existing monuments located throughout the work areas which may be utilized for secondary control monumentation. All new monuments set shall be stamped with "HSM" and a three digit number. For example, "HSM-005" or "HSM-120." The three digit number shall not be duplicated.

2.3.3 Horizontal and vertical control shall be accomplished according to generally accepted survey practices. Accuracies for new surveys shall be as a minimum Third Order, Class I for horizontal and Third Order for vertical.

2.4 Control Stations or Monument Witnessing. All monuments set or found shall be witnessed by a 5 1/2-foot steel fence post or a 5 1/2-foot "Carsonite" or equivalent marker with appropriate plaque attached, and set firmly in the ground at positions specified as follows:

2.4.1 Witnesses for monuments shall be placed approximately 1 foot distant with the attached plaque facing the monument.

2.4.2 Monuments set in roads or highways may be witnessed on either side of the road or highway, normal to the monument, having the appropriate attached plaque facing the monument with the monument designation and offset distance stamped thereon.

2.4.3 Witnesses for monuments set in roads or highways shall be placed in the following manner:

2.4.3.1 One foot beyond the back of ditch or at the right-of-way fence, as applicable.

2.4.3.2 On fills, the witness shall be set on the shoulder or the back side of the guardrail.

2.4.3.3 In cuts, the witness shall be set 1 foot past the back of ditch or at the toe of cut.

2.5 Note Keeping.

2.5.1 Field notes (not collected electronically) shall be recorded in "Rite in the Rain" field books No. 301 "Transite" or No. 311 "Level," and shall be retained indefinitely for future reference.

2.5.2 Notes will be entered in a neat, legible, and sequential order in the directed format. There shall be no erasures.

2.6 Descriptions.

2.6.1 Descriptions shall be provided for all monuments found or set and will be recorded in a comprehensive order, segregated categorically as to datum, i.e., horizontal, vertical, or both.

2.6.2 Descriptions shall be field recorded in a "Level" field notebook, or appropriate forms as authorized, and will contain, but not be limited to the following information:

- a. Type of monument.
- b. Official designation and year.
- c. Stamped designation and year.

d. Condition of monument.

e. Position of witness.

f. Condition of witness.

g. Location of monument referenced to local features in a manner sufficient to ensure an expeditious recovery.

**2.7 Data Collection.** Field information obtained by electronic data collector shall be recorded and archived in readable format using Microsoft Disk Operating System (MSDOS) and shall be presented in the American Standard Code for Information Interchange (ASCII) format, which can be read by an IBM personal or compatible computer.

**2.8 Computations.**

**2.8.1** The contractor shall arrange the computations in a sequential and understandable order, with narrative when appropriate, to enable a review with a minimum of reconstruction.

**2.8.2** The contractor shall provide a listing of the unadjusted bearings/azimuths, distances, and coordinates of all traverses. The data shall be arranged in a sequential and understandable order. The error of closure shall be shown.

**2.8.3** The contractor shall provide a listing of the adjusted bearings/azimuth, distances, coordinates, and constants used for Washington State Plane Coordinate System NAD83 for all traverses and all monuments found or set. The data shall be arranged in a sequential and comprehensive order. The only adjustments allowed are the compass rule or the least squares method.

**2.8.4** The coordinate list requested in paragraph 2.8.2 above, shall show the scale elevation, grid factors, and year of the adjustment of the National Geodetic Vertical Datum (NGVD).

**2.9 Standards.**

**2.9.1 Horizontal.** Horizontal surveys shall be accomplished by the use of conventional line of site instruments or Global Positioning System (GPS) equipment meeting or exceeding the Federal Geodetic Control Committee (FGCC) Standards and Specifications.

**2.9.1.1** All traverses shall meet or exceed the field procedure specifications and distance accuracy standards of the FGCC Standards and Specifications for Geodetic Control Networks for Third Order, Class I, surveys unless otherwise directed by this agency.

**2.9.1.2** All survey control points utilized shall be part of a closed traverse originating and closing on separate coordinated monuments.

**2.9.1.3** Traverses shall not originate and close to the same control point unless authorized by this agency.

**2.9.1.4** Lines of sight shall be clear of all obstacles.

**2.9.1.5** The line of sight for distances obtained by electronic distance meter (EDM) shall be clear for a minimum of 2 feet between the ground or obstacle and the instrument and reflector.

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2.9.1.6 Distances by EDM in conjunction with a data collector shall be obtained along the course measured with each sighting of the instrument in the "Direct" position.

2.9.1.7 An index error and collimation check and/or adjustment on all directional instruments shall be performed at the beginning of assigned projects with documentation submitted to this agency.

2.10 Vertical. All monuments found or set shall be controlled vertically by the "differential" method or orthometric height determination by GPS. Trigonometric leveling will not be utilized unless authorized by this agency.

2.10.1 Differential Leveling. All vertical lines, loops, and control shall meet or exceed the elevation accuracy standards and field procedure specifications of the FGCC Standards and Specifications for Geodetic Control Networks for Third Order surveys unless otherwise directed by this agency.

2.10.1.1 All vertical control level lines shall originate and close to separate benches having at least one check connection from each to the nearest acceptable elevation.

2.10.1.2 Leveling shall not originate and close to the same bench unless said bench has been check connected to the nearest acceptable elevation.

2.10.1.3 Lengthy level lines shall have temporary benchmarks established at intervals not to exceed one half mile

2.10.1.4 .A "Peg Test" for collimation error on all leveling instruments utilized shall be performed at the beginning of each workday or when it has become apparent that the instrument may be out of adjustment. Tolerance will not exceed five thousandths (0.005) feet

2.10.2 Orthometric Height Determination by GPS (Leveling).

2.10.2.1 Order of Accuracy. The quality of NGS vertical control should be at least of the same order as is required of the project results.

2.10.2.2 Supplemental Leveling. Differential leveling as specified above shall be utilized to supplement the NGS benchmarks.

2.10.2.3 Never skip over an NGS benchmark that is near or in the project area and set up on benchmarks whenever possible. The spacing locations of vertical control in the project area should be arranged so that each quadrant and the center of the job have a reference elevation insuring that the complete area is surrounded by differentially established reference stations. Quality control checks should be performed between pairs of GPS points in all quadrants and the center of the job.

2.10.2.4 Geoid Modeling. Geoid 90 shall be used to determine the separation between geoid and the ellipsoid. Geoid 90 refers to geodetic reference system 1980 (GRS80).

2.10.2.5 Field Operations Quality Control Measures.

- a. Ensure precise and accurate HI measurements.
- b. Perform longer than minimally required observations.

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c. Ensure the use of high order NGS vertical control stations.

d. Observe between two points with known differential elevations with every receiver combination possible to prove the integrity of equipment.

e. Perform repeat occupations of reference stations to check and prove HI measurements gathering enough data to create realistic error statistics in geolab, or a similar least squares adjustment program.

f. Mark all equipment that is used as a set (tripods, tribracks, receiver, etc.) taking care not to split up or combine components of other setups during the duration of job.

2.10.2.6 Horizontal Control Accuracy. First order horizontal stations shall be occupied as part of the control network. The reference datum should be NAD83, latest adjustment. At least three horizontal stations shall be incorporated into the network to solve for rotation parameters.

### 3.0 Aerial Flight Operations.

3.1 Aircraft. The aircraft furnished under this contract shall be capable of stable performance at any altitude and air speed required to obtain the photography and shall be equipped with essential navigation and photographic instruments and accessories necessary. Windows shall not be interposed between the camera lens system and the terrain to be photographed. The camera lens system shall not be in the direct path of any exhaust gases or oil from aircraft engines.

3.2 Flight Plan. The minimum area to be photographed is indicated on maps provided. The contractor shall design the flight lines for the photography to obtain proper sidelap and endlap of each flight line and to assure full stereoscopic photographic coverage of the entire project area. Flight lines shall be flown in a north-south direction.

3.3 Scale of Photography. The flight height above the average elevation of the ground shall be such that the negatives have an average scale suitable for attaining the required photogrammetric measurement, map scale, contour interval, and accuracy. Negatives having a departure from the specified scale of more than 5 percent because of tilt or any changes in the flying height may be rejected. Photo scale shall be 1:6000 or 1 inch equals 500 feet.

3.4 Overlap. The film takeup shall be in the direction of flight to allow stereoscopic viewing of the uncut roll of film. Unless otherwise directed by the Contracting Officer, the overlap shall be sufficient to provide full stereoscopic coverage of the area to be photographed, as follows:

3.4.1 Boundaries. All of the area appearing on the first and last negative in each flight line extending over a boundary shall be outside of the boundary of the project area. Each strip of photographs along a boundary shall extend over the boundary not less than 15 percent or more than 55 percent of the width of the strip.

3.4.2 Endlap. The endlap shall average not less than 57 percent or more than 62 percent. Endlap of less than 55 percent or more than 68 percent in one or more negatives may be cause for rejection of the negative or negatives in which such deficiency or excess of endlap occurs.



3.10.3 Focal Length. The calibrated focal length of the lens shall be 153 millimeters, plus or minus 3 millimeters, and measured to nearest 0.001 millimeter.

3.10.4 Platen. The focal plane surface of the platen shall be flat to within 0.013 millimeters and shall be truly normal to the optical axis of the lens. The camera shall be equipped with means of holding the film motionless and flat against the platen at the instant of exposure.

3.10.5 Fiducial Marks. The camera shall be equipped with a minimum of four fiducial marks, with eight preferable, for accurately locating the principal point of the photograph. The lines joining opposite pairs of fiducial marks shall intersect at an angle within 1 minute of 90 degrees.

3.10.6 Lens Distortion. The absolute value of radial distortion measured at maximum aperture, as stated in the calibration report, shall not exceed 0.01 millimeter. The tangential distortion shall not exceed 0.005 millimeters.

3.10.7 Lens Resolving Power. With appropriate filter mounted in place, the Area Weighted Average Resolution (AWAR) shall not be less than 60 lines/millimeter when measured on type VF spectroscopic plates at maximum aperture stated in calibration report. The lens shall be fully corrected for color photography.

3.10.8 Filter. An appropriate light filter with an antivignetting metallic coating shall be used. The two surfaces of the filter shall be parallel to within 10 seconds of arc. The optical characteristics of the filter shall be such that its addition and use shall not cause any undesirable reduction in image resolution and shall not harmfully alter the optical characteristics of the camera lens.

3.10.9 Shutter. The camera shall be equipped with a between-the-lens shutter of the variable speed type, with efficiency that shall be at least 80 percent at the fastest rated speed.

#### 4.0 Aerial Film.

4.1 Type of Film Required. The contractor shall furnish aerial film of a quality that is equal or superior to Agfa AVI Color N200PE1 film. Only fresh, fine grain, dimensionally stable, safety base aerial film shall be used. Outdated film shall not be used.

4.2 Processing of Exposed Film. The processing, including development and fixation, and washing and drying of all exposed photographic film shall result in negatives free from chemical or other stains, containing normal and uniform density, and fine grain quality. Before, during, and after processing, the film shall not be rolled tightly on drums or in any way stretched, distorted, scratched, or marked, and shall be free from finger marks, dirt, or blemishes of any kind.

4.3 Quality of Photography. The negatives shall be free from static marks, shall have uniform color tone, and shall have the proper degree of contrast for all details to show clearly in the darktone and highlight areas as well as in the halftones between the dark and the light areas. Negatives having excessive contrast or negatives low in contrast may be rejected.

4.4 Unexposed Film. Whenever any part of an unexposed roll of film remains in the camera, before such film is used on a subsequent day, a minimum 3-foot section of the roll of film shall be rolled forward unexposed immediately preceding the beginning of photography.

**4.5 Labeling.** Each negative shall be labeled clearly as follows:

<u>Site Name</u>	<u>Date Flown</u>	<u>Flight Firm</u>	<u>Length</u>	<u>Focal Scale</u>	<u>Photo Number</u>	<u>Time of Day/Hrs</u>
HANFORD,WA	14 AUG,	VAP,	FL= 153.57,	1:4800,	W90-1-100	1122

The site name, date of photography, flight firm, focal length in millimeters, photo scale, and photo number shall be on each print. On the first and last photo of each flight strip, the time of day in 24-hour clock will also be shown to depict time of actual flight. All labeling shall be on the northern most edge of the photo with lettering a minimum of two-tenths (0.2)-inch high and shall result in easily read, sharp, uniform letters and numbers.

**4.6 Deliveries.** All negatives and uncut film positives shall be delivered on winding spools in an airtight plastic canister with each canister labeled to show the name and address of the contracting agency, name of the project, designated roll number, numbers of the first and last numbered negatives of each strip, date of each strip, approximate scale, focal length of lens in millimeters, contract number and the name and address of the contractor. At least 3 feet of clear film shall be left on or spliced to each end of the roll. All splices shall be of a permanent nature. All negatives should meet the Hypo Test HT-2 Standard.

**5.0 Contact Prints.**

**5.1 Material.** All contact prints shall be 9"x9" and shall be printed on Kodak Ultra, Portra or Supra, or equal paper with matte finish.

**5.2 Processing and Quality.** The processing shall result in finished photographic prints having finegrain quality, normal uniform density, and such color tone and degree of contrast that all photographic details of the negative from which they are printed show clearly in the darktone areas and highlight areas as well as in the halftones between the dark and the high light. Excessive variance in color tone or contrast between individual prints will be cause for their rejection. All prints shall be clear and free of stains, blemishes, uneven spots, air bells, light fog or streaks, creases, scratches, and other defects which would interfere with their use or in any way decrease their usefulness.

**5.3 Trimming.** All contact prints shall be trimmed to neat and uniform dimensional lines along image edges (without loss of image) leaving distinctly the camera fiducial marks. Prints lacking fiducial marks shall be rejected.

**5.4 Deliveries.** All prints shall be delivered to the Contracting Officer in a smooth, flat, and usable condition. Prints shall be neatly and accurately separated and delivered in sets. Individual photographs shall be grouped on order by flight lines. An additional set of negatives, contact prints, and map sheets will be delivered to Westinghouse Hanford Co. (WHC), Environmental Data Management for archiving.

**6.0 Photo Controlling.**

**6.1 Photo Panels.**

**6.1.1 Photo Panels** or aerial targets shall be of the following size and type unless otherwise specified by this agency.

Type A: 32-inch wide "Onion Sack" material strips placed in a "Cross" position, having a 6-foot overall length with 3 feet being the length of each leg of the "Cross." The material shall have a white section running longitudinal, 8 inches in width, with remainder a dark orange color.

Type B: 6-inch wide "Flexoline" wet reflective pavement marking tape placed in a "Cross" or "T" position, with 3 feet being the length of each leg.

#### 6.1.2 Placement.

- a. Photo panels shall be placed at all monument positions with provisions to ensure that the monument cap is unobscured.
- b. Type B panels shall be used for monuments placed in paved roads or highways.
- c. All panel sites shall be cleared of weeds, tall grass, and low brush for a minimum of 6 feet from the monument to ensure the conformity of the panel to the ground.
- d. Vegetation on private lands shall not be cut without permission of the owner, owner authorized representative or occupant.

#### 6.1.3 Elevations. Elevations shall be obtained at each panel site according to the following:

- a. Ground elevation to within 0.03 meters.
- b. Top of panel to within 0.03 meters.
- c. Top of monument to within 0.003 meters.

6.1.4 All photo panels shall be removed following notification of flight photo acceptability. Removal shall be according to DOE Hanford Site disposal policies.

6.2 Control Surveys. All horizontal and vertical control surveys required for photogrammetric mapping shall conform to paragraph 2.0 of this specification.

6.3 Supplemental Control. When directed, the contractor shall establish, by field survey methods, on the first and last model of each continuous flight line, three horizontal and vertical control points. There shall be set by the same methods, a minimum of one horizontal and vertical point every third model placed for best utilization of the model or as determined by the Cartographer/Photogrammetrist.

6.4 Control Photographs. All horizontal and vertical control points, including supplemental control points, shall be marked and labeled with the appropriate point identification number. All control points not premarked shall be neatly pinpricked and described on the back of the photograph. No point shall be pinpricked on more than one photograph. A standard symbolization for indicating various kinds of control points has been adopted, and is shown in the following tabulation. An existing point shall be shown on the photograph if it is recovered and identified. Horizontal control points shall be pricked on odd-numbered photos. Vertical control shall be pricked on even-numbered photos. No point shall be pricked on more than one photograph.

6.5 Archive. All control photographs will be archived by USACE for future reference.

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**7.0 Diapositives.**

**7.1 Type of Diapositive.** All diapositive transparencies used for photogrammetric measurements, including map compilation, shall be equal or superior in quality to Kodak No. 4004 Duraclear or equivalent.

**7.2 Processing and Quality.** All diapositives shall comply with the requirements for contact prints in paragraph 7.0.

**7.3 Archives.** All diapositives utilized for the purpose of stereo compilation shall be archived by USACE for future references.

**8.0 Aerotriangulation.**

**8.1 General.** The USACE shall determine the X, Y, and Z coordinates for all supplemental control points using fully analytical aerotriangulation methods.

**8.2 Equipment.** The photogrammetric instruments shall have sufficient accuracy and utility for measuring the X and Y photographic coordinates of the fiducial or other photographic reference marks, targets, photographic images, and artificially marked points to achieve the required accuracies.

**8.3 Ground Control Requirements.** The USACE shall be responsible for determining the optimum location, quality, and accuracy of all ground control points used for aerotriangulation. Unless otherwise specified, there shall be at least one vertical control point for every two stereoscopic models and one horizontal control point for every four stereoscopic models.

**8.4 Accuracy.** Digital data accuracy is the root mean square error for the X, Y, and Z coordinates of all supplemental control points determined by analytical aerotriangulation shall not be in error by more than 1:9000 in horizontal position (X and Y) and 1:6000 by elevation (Z) when expressed as a fraction of the flying height.

**8.5 Supplemental Control.** Unless otherwise directed, all supplemental control points will be physically drilled (pugged) on the photo diapositive. When practical, there shall be no less than six (6) supplemental control points established for each stereoscopic model. A supplemental control point shall be located at or near the principal point of each photograph with the other four (4) points located near each corner of the model, preferably, in the overlap area between adjacent models and strips.

**8.6 Control Points.** The image of all ground control and supplemental control points shall be appropriately marked and identified on a set of contact prints. The identifying number for each supplemental control point shall be recorded on the photograph on which the control point appears and shall not exceed four digits.

**9.0 Mapping.** The area to be mapped will be as outlined on a project map and as discussed by the end user.

**9.1 Map Scale.** Scale of plotted maps shall be 1:1000 metric with a 1/2-meter contour interval.

**9.2 Map Compilation.** All mapping will be produced by stereo compilation methods and shall be accomplished with an analog, analytical or softcopy stereoplotter capable of achieving the required accuracies specified in the following paragraphs. Edited digital maps shall be intergraph

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design file formats with submittal of ARC/INFO file formats to DOE as specified in paragraph 10.1 through 10.1.6.

### 9.3 Map and Digital Data Contents.

9.3.1 Coordinate Grid. Unless otherwise specified, grid ticks and lines of the applicable State Plane Coordinate System shall be properly annotated at the top and right edge of each sheet in both the map and digital files.

9.3.2 Control. All horizontal and vertical ground control and all supplemental control determined by either field or aerotriangulation methods shall be shown on the map manuscript and in the digital files.

9.3.3 Planimetry. The maps and digital files shall contain all the planimetric features which are visible or identifiable on, or are interpretable from the aerial photographs as described in the following paragraphs.

9.3.4 Topography. The map shall contain all representable and specified topographic features which are visible or identifiable on, or are interpretable from the aerial photography. Each contour shall be drawn sharp and clear as a solid line except through densely wooded areas where the ground cannot be seen and where it is obscured by an overhanging bluff or ledge, which will be drawn as a dashed line. Labeling or numbering of contours shall be placed so that the elevation is readily discernable, and without interruption of the contour line. Labeling of intermediate contours may be required in areas of little relief. A digital terrain model (DTM) will be created using the digital contours at an appropriate sampling interval for the purpose of orthophotography development.

9.3.5 Spot elevations. Spot elevations determined photogrammetrically shall be shown on the maps in proper position at water level on the shoreline of lakes, reservoirs, ponds, on hilltops, in saddles, at the bottom of depressions, at intersections and along centerlines of well-traveled roads, principal streets in cities, along railroads, levees, and highways, and at the centerline of ends of bridges. In areas where the contours are more than 100 feet apart at map scale, spot elevations shall be shown equidistant from the contours with a maximum spacing of 100 feet.

9.3.6 Digital Layer Collection. Digital data will be collected as discrete separate files or layers into logical feature groups as detailed below. Spacial data layers shall be organized digitally into feature groups, as detailed below, with the digital line graphs (DLG) attribute coding system being utilized in the ARC/INFO translation. However some features such as contours will require further separation due to magnitude of file sizes in bytes. The digital line graph (DLG) coding scheme will be used to identify each mapped feature. This coding scheme will be provided to the vendor.

### SPACIAL DATA LAYERS

				USGS
				<u>DLG CODE</u>
A. CONTOURS				
MAJOR	LV=5	WT=3	LC=0 CO=1	020 0200
MINOR	LV=4	WT=0	LC=0 CO=4	020 0200
CONTOUR VALUES	LV=6	WT=0	LC=0 CO=7	02N
SPOT ELEVATIONS	LV=7	WT=0	LC=0 CO=7	020 0300

**B. TRANSPORTATION**

						USGS	
						DLG	CODE
<b>ROADS</b>							
PAVED 4 LANE	LV=9	WT=1	LC=0	CO=5	LINE STRING	170	
PAVED 2 LANE	LV=10	WT=1	LC=0	CO=5	LINE STRING	170	VAR
UNPAVED DIRT	LV=11	WT=1	LC=2	CO=5	LINE STRING	170	0211
UNPAVED GRAVEL	LV=12	WT=1	LC=2	CO=5	LINE STRING	170	0211
<b>PARKING LOTS</b>							
PAVED	LV=15	WT=1	LC=0	CO=5	LINE STRING	170	0215
UNPAVED DIRT	LV=16	WT=1	LC=2	CO=5	LINE STRING	170	0215
UNPAVED GRAVEL	LV=17	WT=1	LC=2	CO=5	LINE STRING	170	0215
<b>RAILROADS</b>							
RAILROAD	LV=19	WT=1	LC=0	CO=5	PATTERN	180	0201

**C. HYDROGRAPHY**

RIVER	LV=20	WT=1	LC=3	CO=7	LINE STRING	050	0200
INTERMITTENT STREAM	LV=21	WT=1	LC=0	CO=7	PATTERN	050	0610
PONDS	LV=22	WT=1	LC=3	CO=7	LINE STRING	050	0421
RIVER ISLANDS	LV=23	WT=1	LC=3	CO=7	LINE STRING	050	0200

**D. INFRASTRUCTURE**

BUILDING FOOTPRINT	LV=26	WT=3	LC=0	CO=3	LINE STRING	200	0400
<b>FENCES</b>							
WASTE SITE	LV=28	WT=1	LC=0	CO=6	PATTERN	200	0206
CHAIN LINK	LV=29	WT=1	LC=0	CO=6	PATTERN	200	0206
BARBWIRE	LV=30	WT=1	LC=0	CO=6	PATTERN	200	0206
GATES	LV=32	WT=1	LC=0	CO=3	LINE STRING	170	0004
SIDEWALKS	LV=34	WT=1	LC=0	CO=5	LINE STRING	200	0201
<b>UTILITIES</b>							
POWER POLES	LV=35	WT=1		CO=3	POINT CELL	NOT DEFINED	
LIGHT POLES	LV=36	WT=1		CO=3	POINT CELL	200	0309
MANHOLES	LV=37	WT=1		CO=5	POINT CELL	200	0317
HYDRANTS	LV=38	WT=1		CO=5	POINT CELL	200	0318

**E. LAND USE/LAND COVER/VEGETATION**

CIRCLE IRRIGATION	LV=40	WT=1	LC=0	CO=2	LINE STRING	070	0103
FIELD LINES	LV=41	WT=1	LC=0	CO=0	PATTERN	070	0103
TREE GROUPINGS	LV=42	WT=0		CO=2	POLYGON	070	0101
SINGLE TREE	LV=43	WT=0		CO=2	POINT CELL	070	0105
BRUSH	LV=44	WT=0	LC=0	CO=2	POLYGON	070	0102
BRUSH RIPARIAN	LV=45	WT=0	LC=0	CO=2	POLYGON	070	NOT DEFINED
<b>DUNES</b>							
DUNES	LV=46	WT=0	LC=0	CO=0	POLYGON	080	0103
<b>URBAN AREAS - HOUSING GROUPS</b>							
URBAN AREAS - HOUSING GROUPS	LV=47	WT=0	LC=0	CO=0	POLYGON	200	0150

**G. BOUNDARY (SITE)**

BOUNDARY (SITE)	LV=50	WT=3	LC=6	CO=3	LINE STRING	090	0111
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**H. CONTROL**

HORIZONTAL, VERTICAL	LV=2	WT=1	LC=0	CO=7	POINT CELL	150	0301
COORDINATE GRID	LV=1	WT=0	LC=0	CO=7	POINT CELL	150	0301
PUG POINTS	LV=3	WT=1	LC=0	CO=5	POINT CELL		

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9.3.7 Edgematching. Digital data shall be overlaid and provided as a continuous line file or seamless coverage. On printed maps, match lines shall be provided and properly labeled so that each sheet may be joined accurately to adjacent sheets.

9.3.8 Guidance provided in EM-1110-1-1000, 31 Jan 92, Photogrammetric Mapping (Final Draft), shall be followed for all map compilation rules and procedures used for this project.

9.4 Accuracy of Maps. All mapping shall meet ASPRS Accuracy Standards for Large Scale Maps, (March 1990), with a statement affixed to each digital file of mapped features as follows: "THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS". Hardcopy accuracy at 1 inch equals 30.5 meters plus or minus .61 meters horizontal accuracy.

9.5 Compilation History. A compilation history (model diagram) shall be prepared for each stereoscopic model used to accomplish the mapping. The history shall include, but not be limited to, the final photographic fit to the X, Y, and Z coordinates of ground and supplemental control points and any other problems encountered in the model orientation and compilation process. The history shall also include the project name, flight date, photo scale, map scale, stereoplotter used, and the operator's name.

9.6 Quality. The professional standards of draftsmanship shall be maintained throughout the mapping process. All symbols, lines, letters, and numbers shall be clear and legible and conform to EM 1110-1-1000, 31 Jan 92, "Photogrammetric Mapping (Final Draft)".

9.7 Testing of Features. Map features will be tested as set forth below:

9.7.1 Pilot Test. A small Intergraph data set from the first stereo model will be used to test all compilation procedures and accuracy checks. This test will be used to assure that the entry procedures are capable of returning a usable product. Changes requested by DOE will be incorporated into revised procedures for further map production.

9.7.2 Planimetry. The accuracy of the digital planimetric map feature compilation will be tested by comparing the ground coordinates (X and Y) of at least 20 well-defined map features per test per map sheet, as determined from measurements on the map at publication scale, to those for the same points, as provided by a check survey of higher accuracy. The check survey will have an order of accuracy and procedures as specified for establishing the mapping control. Maps will also be examined for errors and/or omissions in defining features, structures, utilities, and other nomenclature; or for total gaps in compilation/coverage. The minimum of 20 points will be distributed throughout the sheet, or concentrated in critical areas. Tests will be made on well-defined points only. Well-defined points are those that are easily visible or recoverable on the ground, such as intersections of roads or railroads, and corners of buildings or structures. In general, what is "well defined" will also be determined by what is plottable at the scale of the map within one one-hundredth (1/100) of an inch. Thus, while the intersection of two property lines meeting at right angles would come within a sensible interpretation, identification of the intersection of such lines meeting at an acute angle would obviously not be practical. Points which are not well defined are excluded from the accuracy test. Generally, it may be more desirable to distribute the points more densely in the vicinity of important structures or drainage features and more sparsely in areas that are of lesser interest.

9.7.3 Coordinates. Coordinates of planimetric features as measured on the map will be compared with coordinates of the same features as determined by ground surveys or by aerotriangulation. Planimetric features may also be checked by stereoplotter.

9.7.4 Spot Elevations. A minimum of 20 points will be checked. These points will be distributed throughout the sheet, or concentrated in critical areas. Spot elevations will be compared with elevations determined by field or photogrammetric methods. The test for vertical accuracy will be

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performed by comparing the elevations at well-defined points as determined from the map to corresponding elevations determined by a survey of higher accuracy.

**9.7.5 Contours.** The accuracy of contouring will be tested by comparison of a profile measured on the map with a profile measured by means of ground surveys, or with a profile measured with a stereo- or analytical plotter. The location of each test traverse will be designated by the Government. The elevation and station will be recorded for each break in the terrain and for each contour elevation. Ground surveyed profiles will be at least 6 inches long at final map scale, with an elevation measured at least every 100 feet on the ground, and should cross at least ten (10) contour lines when possible. Profiles measured by stereoplotter will be at least 10 inches long at finished map scale, and the true elevation will be recorded where each plotted contour crosses the profile line. Profiles should start and close upon map features or previously established control points. In flat areas and at principal road and rail intersections, spot elevations will be checked. In general, one profile per map sheet is sufficient.

**9.7.6 Intensity of Testing.** At least one map sheet per flight line or modeled strip for the project will be tested. Additional tests will be made when there is reason to suspect the quality of the mapping in general or at any specific location.

## **10.0 Digital Map Conversion to ARC/INFO File Formats.**

**10.1** Digital files as defined below will be furnished to DOE after completion of all map generation.

**10.1.1 General.** All ARC/INFO files shall be created in ARC/INFO 6.0.1. The coverages shall be organized within the ARC/INFO model on a map sheet basis identical to the map sheet defined by the Intergraph design files. Coordinates of the ARC/INFO coverages shall be double precision and shall match the coordinates as displayed through a coordinate read-out from the design files. All coverages shall be free of topological errors. Include the following feature types:

**areas** - a closed figure or polygon that enclose a homogeneous area.

**lines** - a set of ordered coordinates that represent the shape of a geographic feature too narrow to display as an area, e.g., streets and streams.

**points** - a single X,Y coordinate that represents a geographic feature that may be too small to display as a line or area.

**10.1.2** Not Used

**10.1.3** Not Used

**10.1.4 Coverage Development.** Coverages shall be developed from the Intergraph design files. In the conversion of the design files to coverage format, separate coverages shall be created according to the following thematic segregations: Topography, Transportation, Hydrography, Infrastructure, Land Use/Land Cover, Wells, and Boundary/Control. In general, linear features shall be converted into line coverages, polygonal features into polygon coverages, and point features shall be converted into point coverages. All text elements in the design files shall be converted to ARC annotations in the appropriate coverages. All text elements associated with points will be tied to the point feature to maintain the necessary feature and text association.

**10.1.4.1 Topography.** Contours from the Intergraph design files shall be entered as continuous, uninterrupted lines, and shall be converted into an ARC/INFO line coverage. Each line shall have an attribute item to describe the elevation represented and an item to designate whether the line is an index contour or an intermediate contour line. Spot elevations shall be included in the

coverage and built as a point coverage. Each spot elevation point shall have an attribute which describes the elevation at that point.

10.1.4.2 Transportation. All levels in the design file which describe transportation features shall be converted into an ARC/INFO line coverage. Types of transportation features shall be as defined in Paragraph 9.3.6, above. Roads will be delineated by edges with no centerline indicated. All aerial extents such as parking lots shall be delineated with polygons.

10.1.4.3 Hydrography. All levels in the design files which describe hydrographic features shall be converted into an ARC/INFO line coverage. Each line shall have an attribute item to describe hydrologic features represented. Additionally, a polygon coverage shall be built to describe hydrologic features with aerial extents such as features as described in paragraph 9.3.6 above.

10.1.4.4 Infrastructure. All levels in the design files which describe infrastructure features shall be converted into an ARC/INFO line coverage. Each line shall have an attribute item to describe the type of infrastructure feature represented (e.g., building footprint, fences, gates, etc.). Additionally, a polygon coverage shall be built to describe infrastructure features with aerial extents such as major buildings.

10.1.4.5 Land Use/Land Cover. All levels in the design files which describe land use, land cover, or vegetative features shall be converted into an ARC/INFO polygon coverage. Each polygon shall have an attribute item to describe the type of land use/land cover feature represented.

10.1.4.6 Wells. All levels in the design files which describe wells shall be converted into an ARC/INFO point coverage. Each point shall have an attribute item to describe the type of well represented.

10.1.4.7 Boundary/Control. All levels in the design files which describe boundary features shall be converted into an ARC/INFO line coverage. Each line shall have an attribute item to describe the type of boundary represented. Additionally, the coverage shall be built as a polygon coverage, and the polygons shall have an attribute item which describes the administrative jurisdiction of the area. Control features, such as survey monuments, shall be converted from the design file into an ARC/INFO point coverage. Each point shall have an attribute item to describe the type of control point and its identifying number.

10.1.5 Conversions Quality Assurance. Verification of the file conversion shall be performed to ensure that all information has been captured correctly, properly attributed, represented in the proper coordinate system, and consistently structured. Visual checking of plotted ARC/INFO coverages against plots of the design files shall be performed to verify that maps are properly replicated in ARC/INFO. A visual check of ARC/INFO spatial data and database shall be performed to assure that all design file text is properly associated to each map feature.

10.1.6 Product Delivery. All digital data of the ARC/INFO coverages, marker set(s), and ancillary tables shall be delivered on 8mm, 2.3 GB streamer tape magnetic tape. Save using: CPio-COV-C32768 [output device on supplier system]. All files shall be converted to ARC file format. (NOTE: If a UNIX platform is not used, all files will be delivered in an ARC Export format).

11.0 Orthophotography. Separate start work authorization.

11.1 General. Prior to commencement of any orthophoto generation, a detailed plan of the proposed layout shall be submitted to DOE for approval, which will include an overall map of the entire compilation area with boundaries indicating the proposed limits of orthophoto generation. Map shall detail the number of ortho images to be produced. This item shall consist of an orthophotograph digitally produced as compiled from photographs utilized for map compilation. Each orthophotograph shall consist of a photographic printing of the photographed area, to the

boundaries specified by removing the image displacements caused by ground relief and by tilt, and shall contain the images of the ground surface and tops of vegetation, buildings, and all other details.

**11.2 Production.** A duplicate set of pugged diapositives as generated for stereo map compilation shall be generated for use in orthophoto production. No delineation of control or pug identifications will be placed on newly created set of diapositives other than actual pug points. A set of control photos with all photo control points identified shall be utilized to provide information necessary in identifying diapositive control points. Scanning of photos will be performed at a density as necessary to produce a set of rectified photo images covering the entire modeled area. Digital contour and spot elevation data produced as a result of map compilation shall be incorporated into orthophoto generation.

**11.3 Materials.** Only finegrain photographic film on a dimensionally stable base shall be used for exposing the initial negative of each orthophotograph as it is compiled. Outdated film shall not be used.

**11.4 Equipment.** The compilation of the orthophotograph shall be accomplished on an instrument capable of making direct enlargements up to 8 diameters between original negative scale and compilation scale. This instrument shall also be capable of producing single or double model orthophotograph negatives in sizes required for this work.

**11.5 Control.** For controlling the compilation of the orthophotograph(s), all essential control will be as gathered from stereo compilation processes.

**11.6 Accuracy.** Ninety percent of all photographic details on the orthophotograph shall be accurate to within at least one-fortieth (1/40) of an inch of true position, as determined by test surveys, and none of the photographic details shall be displaced by more than one-twentieth (1/20) of an inch from true coordinate position.

**11.7 Grid Ticks.** All orthophoto's will show the grid tick as well as their values.

**11.8 Quality.** The photographic negative of the orthophotograph shall have uniform color tone and shall have the degree of contrast which will cause all details to show clearly in the darktone areas and in the highlight areas as well as in the halftones between the dark and highlight. Negatives having excessive contrast or negatives low in contrast may be rejected. Exposure scan lines shall not be noticeable or detracting from the photographic details. All digital contour information can be provided to the contractor for orthophotography production.

**11.9 Output.** Orthophoto production shall yield photographs with no overlap at the specified map scale of 1:1000 for the entire mapped area under this work task. Products produced as a result of complete orthophoto generation are as follows:

a. Two sets of orthophoto prints in paper form equal in format as produced for mapping. One set for USACE and the other will be delivered to WHC, Environmental Data Management, Environmental Restoration Program.

b. One set of orthophoto mylar prints, USACE retained.

c. A copy of each ortho image in .COT and .TIFF format compatible with Intergraph and ARC/INFO software products, respectively. Files will be saved and submitted as specified in paragraph 10.1.6. Intergraph .COT shall be retained by USACE. TIFF files may be proportioned as necessary to permit successful file manipulation in ARC/INFO.

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**11.10 Archives.** All materials including the orthophotograph negative(s), the control prints, and the diapositives shall be archived following established records management procedures. An additional set of orthophotos will be delivered to WHC, Environmental Data Management, Environmental Restoration Program.

**12.0 Safety.**

**12.1 Health Physics Technician (HPT) support shall be provided by the Westinghouse Hanford Company. The contractor shall provide a schedule of work to promote scheduling of HPT support.**

**12.2 Site specific training support will be provided by Westinghouse Hanford Company and Kaiser Engineers Hanford, as appropriate.**

**12.3 Hanford Site health, safety and security requirements shall apply to all work. The contractor shall coordinate with each local landlord concerning specific site requirements.**

**12.4 A safety meeting shall be held the first workday of each work week by all survey parties.**

**12.5 A report of safety meetings shall be entered in the space provided on the back of the Daily Work Report forms provided.**

**12.6 The contractor shall comply with all established fire protection and control regulations of the Hanford site.**

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MEMORANDUM FOR RECORD

SUBJECT: Mapping Support for CENPW-EN-EE of 100 and 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

The following information outlines comments as received 13 Aug 92, by Mr. Richard Hibbard, 1100-EM-1 Unit Manager, 1100 Area Survey and Mapping Activities, in reference to subject specifications dated 19 May 92, revised 27 Jul 92. A meeting was held on 20 Aug 92 to discuss these comments with the following in attendance. Section references are to subject specifications enclosed.

<u>NAME</u>	<u>ORGANIZATION</u>	<u>PHONE</u>
John Stewart	USACE	509-376-9101
Bob Meyer	USACE	509-522-6652
Tom Seiner	USACE	509-522-6421
Linda Dietz	WHC	509-372-0804
Nancy Werdell	DOE-RL	509-376-5500
Joy Dankers	U.S. Dept. of Ecology	206-493-9366
Bob Stewart	DOE-RL	509-376-6192
Dick Fox	WHC	509-376-3261
Arthur Bennett	USACE	509-522-6639

Answers are provided in response to each comment.

Section 1.0.b

Comment: Add the word Area after 1100.

Answer: Concur

Section 1.0.d

Comment: Globally fix ARCINFO to ARC/INFO in this file.

Answer: Concur

Section 2.2.1

Comment: Insert at end of paragraph the following sentence: All control coordinates will be recorded electronically and managed for other future site activities.

Answer: Concur

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CENPW-EN-GB-SM (200-1c)

SUBJECT: Mapping Support for CENPW-EN-EE of 1100 & 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

Section 2.2.2

Comment: Insert at end of paragraph the following sentence: All control coordinates will be recorded electronically and managed for other future site activities.

**Answer:** Concur

Section 2.7

Comment: Change first sentence to read: Field information obtained by electronic data collector shall be recorded and archived in readable format using Microsoft Disk Operating System (MSDOS) and shall be presented in the American Standard Code for Information Interchange (ASCII) format, which can be read by an IBM personal or compatible computer.

**Answer:** Concur

Section 5.4

Comment: Insert at end of paragraph the following sentence: An additional set of negatives, contact prints, and map sheets will be delivered to Westinghouse Hanford Co. (WHC), Environmental Data Management for archiving.

**Answer:** Concur

Section 9.3

Comment: Insert a new section:

Section 9.3

Stereo Compilation And Model Setup Procedures:

Explain how:

- photo model values are compared to ground survey coordinates - RMS error factor

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CENPW-EN-GB-SM (200-1c)

**SUBJECT:** Mapping Support for CENPW-EN-EE of 1100 & 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

- loading, clearing and registering pug points and photos - reporting of residuals aerotriangulation values (+ or - values)
- compilation rules (top down approach to digitizing)

**Answer:** Concur. Information has been added referencing EM-1110-1-100, Photogrammetric Mapping Manual.

#### Section 9.3.4

**Comment:** Change sentence beginning with "Labeling or numbering" to read: Labeling or numbering of contours shall be placed so that the elevation is readily discernable, and without interruption of the contour line.

**Answer:** Concur

#### Section 9.3.6

**Comment:** Insert at end of paragraph the following sentences: The digital line graph (DLG) coding scheme will be used to identify each mapped feature. This coding scheme will be provided to the vendor.

**Answer:** Concur. Each feature type as defined in 9.3.6, will be separated by levels and files as deemed necessary to achieve adequate separation of mapped features. These can be directly correlated with DLG coding scheme.

#### Section 9.3.7

**Comment:** Change first sentence to read: Digital data shall be overlaid and provided as a continuous line file or seamless coverage.

**Answer:** Concur pending further discussions as to "continuous line file".

#### Section 9.3.8

**Comment:** Guidance provided in EM-1110-1-1000, 31 Jan 92, Photogrammetric Mapping (Final Draft), shall be followed for all map compilation rules and procedures used for this project.

CENPW-EN-GB-SM (200-1c)

SUBJECT: Mapping Support for CENPW-EN-EE of 1100 & 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

Section 9.4

Comment: Change first sentence to read: All mapping shall meet the ASPRS Accuracy Standards for Large Scale Maps, (March 1990), with a statement affixed to each digital file of mapped features as follows:

Last sentence convert 100 feet to even metric values.

**Answer:** Concur pending further review of ASPRS document.

Section 9.7.1

Comment: Insert new section:

Section 9.7.1

Pilot Test:

A small Intergraph data set from the first stereo model will be used to test all compilation procedures and accuracy checks. This test will be used to assure that the entry procedures are capable of returning a usable product. All stereo compilation work will be halted until the pilot test and procedures are verified.

**Answer:** It was agreed by discussion that one test model would be forwarded to Joy Dankers in DGN file format for review. Map compilation will not be halted during period of testing, however, changes requested by DOE will be incorporated into revised procedures for further map production.

Section 9.7.2

Comment: Change first sentence to read: The Accuracy of the digital planimetric map feature compilation will be tested by...

**Answer:** Concur. A new paragraph, 9.7.6, has been added to further define intensity of testing.

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CENPW-EN-GB-SM (200-1c)

SUBJECT: Mapping Support for CENPW-EN-EE of 1100 & 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

Insert at end of paragraph the following sentence:  
All text elements associated with points will be tied to the point feature to maintain the necessary features and text association.

**Answer:** Concur

Section 10.1.4.1

Comment: Change first sentence to read: Contours from the Intergraph design files shall be entered as continuous, uninterrupted lines, and shall be converted into an ARC/INFO line coverage.

**Answer:** Concur. Contour lines will not have breaks or separations for text or for other reasons. Good vector line interconnections are expected.

Section 10.1.4.2

Comment: Change paragraph to read as follows:

All levels in the design files which describe transportation features shall be entered as continuous, uninterrupted lines, and shall be converted into an ARC/INFO line coverage. Each line shall be digitally entered using the roads center line and shall have an attribute item to describe the type of road feature represented. Additionally, a polygon coverage shall be built to describe all aerial extents such as parking lots.

**Answer:** Concur. However, no road centerline will be delineated. Transportation features will be delineated by vector data along the edges of roads, and no attributing will be performed on any features other than as defined in feature separation in Paragraph 9.3.6.

CENPW-EN-GB-SM (200-1c)

SUBJECT: Mapping Support for CENPW-EN-EE of 1100 & 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

Section 10.1.4.3

Comment: Change last sentence to read: Additionally, a polygon coverage shall be built to describe hydrologic features with aerial extents such as major rivers, lakes, ponds, island, and upland areas.

**Answer:** A change has been made to indicate specific reference to paragraph 9.3.6, feature types.

Section 10.1.4.4

Comment: Insert at end of paragraph the following sentence: Additionally, a polygon coverage shall be built to describe infrastructure features with aerial extents such as major buildings.

**Answer:** Concur

Section 10.1.5

Comment: Insert at end of paragraph the following sentence: A visual check of ARC/INFO spatial data and database shall be performed to assure that all design file text is properly associated to each map feature.

**Answer:** Concur

Section 10.1.6

Comment: Change last sentence to read: All files shall be converted to ARC file format. (NOTE: If a UNIX platform is not used, all files will be delivered in an ARC Export format.)

**Answer:** Concur

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CENPW-EN-GB-SM (200-1c)

SUBJECT: Mapping Support for CENPW-EN-EE of 1100 & 300 Areas, Hanford Site, Technical Specifications for USACE Survey and Mapping Activities, 1100 Area Hanford Site, Comment Resolution

Section 11.0

Comment: Section 11 on, is not approved. Missing information on:

- the size and formats of the orthophotos and
- extent of area coverage/orthophoto

**Answer:** This paragraph has been expanded to include the information requested. A submittal of the layout will be provided to DOE for approval prior to any orthophoto production.

Section 11.10

Comment: Change paragraph to read as follows:  
All materials including the orthophotograph negatives, the control prints, and the diapositives shall be archived following established records management procedures. An additional set of orthophotos will be delivered to WHC, Environmental Data Management, Environmental Restoration Program.

**Answer:** Concur

Additional changes that have been incorporated:

Paragraph 9.1. The paragraph is changed to read "Scale of plotted maps shall be 1:1000 metric with a 1/2-meter contour interval.

**ORIGINAL SIGNED BY**

ARTHUR BENNETT  
Chief, Survey and Mapping Section

CF:

CENPW-HN (Stewart)  
CENPW-EN-EE (Foote)  
CENPW-EN-GB (Miklancic)  
CENPW-EN (D. Johnson)  
CENPW-EN-GB-SM

# CORRESPONDENCE DISTRIBUTION COVERSHEET

Author: John T. Stewart, USAC      Addressee: R. D. Izatt, RL      Correspondence No.: Incoming: 9208200

Subject: TASK ORDER DE-AT06-90RL12103 UNDER MASTER INTERAGENCY AGREEMENT NO. DE-AI06-90RL12074; 1100-EM-1 OPERABLE UNIT REMEDIAL INVESTIGATION/FEASIBILITY STUDY; SURVEY AND MAPPING TECHNICAL SPECIFICATION

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		R. D. Wojtasek, Assignee	L4-92	
		EDMC	H4-22	X



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