

1 **PART III UNIT-SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS**
2 **OPERATING UNIT 11**
3 **Integrated Disposal Facility**

4 **Appendix 4A – Section 2**

Critical Systems

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Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
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1 SECTION 02315--FILL AND BACKFILL

2

3 PART 1--GENERAL

4

5 WORK INCLUDED:

6

7 This section describes placement and testing of fill and backfill in general areas of the site
8 (including stockpiles).

9

10 REFERENCES:

11

12 The following is a list of standards which may be referenced in this section:

13

14

ASTM INTERNATIONAL (ASTM)

15

16

ASTM D75 Standard Practice for Sampling Aggregates

17

ASTM D422 Standard Test Method for Particle-Size Analysis of Soils

18

ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using
Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

19

20

ASTM D1140 Standard Test Method for Amount of Material in Soils Finer Than the

21

No. 200 (75 micrometer) Sieve

22

ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by

23

the Sand-Cone Method

24

ASTM D2216 Standard Test Method for Laboratory Determination of Water

25

(Moisture) Content of Soil and Rock by Mass.

26

ASTM D2922 Standard Test Methods for Density of Soil and Soil-Aggregate in Place
by Nuclear Methods (Shallow Depth)

27

28

ASTM D3017 Standard Test Method for Water Content of Soil and Rock in Place by

29

Nuclear Methods (Shallow Depth)

30

31

DEFINITIONS:

32

33

Relative Compaction:

34

35

Ratio, in percent, of as-compacted field dry density to laboratory maximum dry
density as determined in accordance with ASTM D698.

36

37

38

Apply corrections for oversize material to maximum dry density.

39

40

Optimum Moisture Content: Determined in accordance with ASTM D698 specified to
determine maximum dry density for relative compaction.

41

42

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1 Prepared Ground Surface: Ground surface after completion of required demolition, clearing
2 and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade
3 preparation.

4
5 Completed Course: A course or layer that is ready for next layer or next phase of Work.

6
7 Lift: Loose (uncompacted) layer of material.

8
9 Geosynthetics: Geotextiles, geocomposites, geosynthetic clay liner, or geomembranes.

10
11 Well-Graded:

12
13 A mixture of particle sizes with no specific concentration or lack thereof of one or
14 more sizes.

15
16 Does not define numerical value that must be placed on coefficient of uniformity,
17 coefficient of curvature, or other specific grain size distribution parameters.

18
19 Used to define material type that, when compacted, produces a strong and relatively
20 incompressible soil mass free from detrimental voids.

21
22 Influence Area: Area within planes sloped downward and outward at 60-degree angle from
23 horizontal measured from:

24
25 1-foot outside outermost edge at base of foundations or slabs.

26 1-foot outside outermost edge at surface of roadways or shoulder.

27 0.5-foot outside exterior at spring line of pipes or culverts.

28
29 Imported Material: Materials obtained from sources offsite, suitable for specified use.

30
31 Standard Specifications: When referenced in this section, shall mean Standard Specifications
32 for Road, Bridge and Municipal Construction, as published by the Washington State
33 Department of Transportation, 2002 edition, English units.

34
35 SLDS: Secondary Leak Detection System.

36
37 Permanent Stockpile: Stockpile of material that remains at the completion of construction.

38
39 SUBMITTALS-APPROVAL REQUIRED:

40
41 See Section 01300, SUBMITTALS, for submittal procedures.

42
43 Submit gradation test results for all imported materials from independent testing laboratory
44 as specified in paragraph SOURCE QUALITY CONTROL in Part 2.

45

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- 1 Stockpile Plan: Prior to any excavation activities associated with construction of the IDF,
2 Construction General Contractor shall submit a Stockpile Plan for approval. The plan shall
3 include the following information:
4
5 Scale drawing, using the project plans as a base, which shows the proposed location
6 for stockpiles on the project site. Show all access roads around stockpiles. Address
7 stockpile locations during construction of the IDF and permanent stockpiles which
8 will remain upon completion of construction activities for this project.
9
10 Stockpile layout drawings which show the estimated location of toe of slope and top
11 of slope for each stockpile. Drawings shall show plan and typical sections and shall
12 be fully dimensioned.
13
14 Plan shall show how differing materials encountered during the excavation will be
15 segregated for future use. This includes material for use as topsoil, admix base soil,
16 and operations layer. Also show a stockpile area for material to be used in the future
17 as clean backfill during landfill operations by the Tank Farm Contractor.
18
19 Method by which stockpile compaction will be achieved.
20
21 Dust control for the stockpiles during active use and until grass is established.
22
23 Placing of topsoil, seeding, fertilizing, and mulching each stockpile after active use of
24 stockpile is finished in accordance with Section 02920, RECLAMATION AND
25 REVEGETATION.
26
27 SUBMITTALS—APPROVAL NOT REQUIRED:
28
29 Information/Record (IR):
30
31 Qualifications of independent testing laboratory.
32
33 Qualifications of construction quality control personnel.
34
35 SEQUENCING AND SCHEDULING:
36
37 Complete applicable Work specified in Sections 02316, EXCAVATION, and 02319,
38 SUBGRADE PREPARATION, prior to placing fill or backfill.
39
40 PERMIT REQUIREMENTS:
41
42 A backfill and fill permit is required for each backfill and fill work element. Construction
43 General Contractor shall obtain from Tank Farm Contractor and post before starting backfill
44 and fill work, as specified in Division 1, General Requirements.
45

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1 CONSTRUCTION QUALITY ASSURANCE:

2

3 The Construction General Contractor shall accommodate all CQA activities described herein
4 and in the CPA Plan for this project. The CQA Plan is made part of these Specifications by
5 reference.

6

7 The CQA Certifying Engineer shall determine in-place density and moisture content by any
8 one or combination of the following methods: ASTM D2922, ASTM D3017, ASTM D1556,
9 ASTM D2216, or other methods approved by the Construction Manager.

10

11 Testing requirements and locations will be determined by the CQA Certifying Engineer.

12 Construction General Contractor shall cooperate with the CQA Certifying Engineer and

13 testing work by leveling small test areas designated by the CQA Certifying Engineer.

14 Backfill test areas at Construction General Contractor's sole expense. The CQA Certifying

15 Engineer may have any material tested at any time, location, or elevation.

16

17 After Construction General Contractor makes repairs to any areas failing a test, the

18 Construction General Contractor shall rerun appropriate tests, subject to the approval of the

19 CQA Certifying Engineer, to demonstrate the area meets specifications, at the Construction

20 General Contractor's sole expense.

21

22 The following minimum test schedule shall be assumed. Additional tests may be required as
23 directed by CQA Certifying Engineer.

24

25 In-place density tests shall be made on the following minimum schedule:

26

27 Earthfill: One per 5,000 square feet (ft²) per lift.

28

29 Structural Fill: One per 2,500 ft² per lift.

30

31 Subgrade Preparation: Four per acre.

32

33 Operations Layer (Outside Edge of Liner): One per 5,000 ft² per lift.

34

35 Operations Layer Material (SLDS): Two (2) per lift.

36

37 Standard Proctor (ASTM D698) laboratory density curves (five-point minimum) shall
38 be performed for each material by the CQA Certifying Engineer. Samples of native
39 materials used for embankment and backfill and samples of imported materials shall
40 be taken at locations as specified by CQA Certifying Engineer.

41

42 Gradation tests (sieve analysis) shall be performed in accordance with ASTM D422
43 on operations layer material obtained from required excavations to demonstrate the
44 materials meet the Specifications. Samples of operations layer material shall be taken
45 from each 10,000 cubic yards of placed material in accordance with ASTM D75.

46

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1 PART 2--PRODUCTS

2

3 EARTHFILL:

4

5 Excavated material from required excavations and designated borrow sites, free from rocks
6 larger than 4 inches in the greatest dimension, from roots and other organic matter, ashes,
7 cinders, trash, debris, and other deleterious materials.

8

9 STRUCTURAL FILL:

10

11 Conform to the requirements of Section 9-03.9(3) Crushed Surfacing-Base Course in the
12 Standard Specifications, except for structural fill beneath leachate storage tank. At this
13 location, utilize crushed surfacing-top course conforming to the requirements of
14 Section 9-03.9(3).

15

16 Material selected from excavation meeting the requirements of Section 9-03.9(3) Crushed
17 Surface-Base Course may be used for structural fill.

18

19 OPERATIONS LAYER:

20

21 Meeting the requirements of earthfill above and having a maximum of 25 percent by weight
22 passing the No. 200 U.S. sieve and a maximum particle size of 2 inches.

23

24 DRAIN GRAVEL:

25

26 Material for drain gravel shall conform to the requirements of Section 9-03.12(4) of the
27 Standard Specifications except material shall be subrounded to rounded gravel. Crushed rock
28 and angular gravel shall not be allowed.

29

30 CRUSHED SURFACING:

31

32 Material for crushed surfacing-base course and top course shall conform to the requirements
33 in Section 9-03.9(3) of the Standard Specifications.

34

35 QUARRY SPALLS:

36

37 Quarry spalls shall consist of broken stone free from segregation, seams, cracks, and other
38 defects tending to destroy its resistance to weather and shall meet the following requirements
39 for grading:

40

41 Maximum Size: 8 inches.

42

43 50 percent by weight shall be larger than 3 inches.

44

45 Minimum Size: 3/4 inch.

46

FILL AND BACKFILL 02315-5 of 9

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1 SOURCE QUALITY CONTROL:

2

3 Gradation tests performed in accordance with ASTM D422 by a qualified independent
4 testing laboratory shall be made for imported materials on samples taken at place of
5 production prior to shipment. Imported materials shall not be shipped without submittal
6 approval. Samples of the finished product for gradation testing shall be taken from each
7 2,000 tons of prepared materials in accordance with ASTM D75. Test results shall be
8 submitted to Construction Manager within 48 hours after sampling.

9

10 BASE SOIL:

11

12 As specified in Section 02666, ADMIX LINER.

13

14 WATER FOR MOISTURE CONDITIONING:

15

16 See Section 02200, SITE PREPARATION, for raw water supply availability and
17 requirements for proper compaction.

18

19 PART 3--EXECUTION

20

21 GENERAL:

22

23 Keep placement surfaces free of water, debris, and foreign material during placement and
24 compaction of fill and backfill materials.

25

26 Place and spread fill and backfill materials in horizontal lifts of uniform thickness as
27 specified in paragraphs BACKFILL UNDER AND AROUND STRUCTURES and FILL, in
28 a manner that avoids segregation, and compact each lift to specified densities prior to placing
29 succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary
30 to keep placement surfaces drained of water.

31

32 Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill
33 or backfill is to be placed is frozen.

34

35 Tolerances:

36

37 Final Lines and Grades: Within a tolerance of 0.1-foot unless dimensions or grades
38 are shown or specified otherwise.

39

40 Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not
41 permitted.

42

43 Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs,
44 piping, and other facilities, caused by settlement of fill or backfill material.

45

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1 BACKFILL UNDER AND AROUND STRUCTURES:

2

3 Under Facilities: Backfill with earthfill or structural fill, as shown on the Drawings, for each
4 structure or facility. Place earthfill or structural fill in lifts of 6-inch maximum compacted
5 thickness and compact each lift to minimum of 95 percent relative compaction as determined
6 in accordance with ASTM D698.

7

8 FILL:

9

10 Outside Influence Areas Beneath Structures, Slabs, Piping, and Other Facilities: Unless
11 otherwise shown, place earthfill as follows:

12

13 Allow for 6-inch thickness of topsoil where required.

14

15 Maximum 8-inch thick lifts.

16

17 Place and compact fill across full width of embankment.

18

19 Compact to minimum 95 percent relative compaction.

20

21 REPLACING OVEREXCAVATED MATERIAL:

22

23 Replace excavation carried below grade lines shown as follows:

24

25 Beneath IDF Cell: Earthfill as specified herein.

26

27 Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.

28

29 Beneath Structures and Roadways: Structural fill or earthfill as shown on the
30 Drawings and specified herein.

31

32 TOPSOIL:

33

34 Place topsoil on areas disturbed by construction and on permanent stockpile slopes in
35 accordance with Section 02920, RECLAMATION AND REVEGETATION.

36

37 STOCKPILING:

38

39 Material shall be placed in permanent stockpiles as follows:

40

41 Place material in maximum 2-foot lifts and compact with a minimum four passes with
42 earth-moving equipment.

43

44 Maximum slopes shall be 3H:1V. Minimum slopes shall be 3 percent to promote
45 drainage.

46

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1 Upper 2 feet of stockpile surface shall be placed in maximum 12-inch thick lifts and
2 compacted to minimum 90 percent relative compaction as determined in accordance
3 with ASTM D698.

4
5 Place 6-inch thick layer of topsoil on completed slopes in accordance with
6 Section 02920, RECLAMATION AND REVEGETATION.

7
8 Permanent stockpiles shall be seeded, fertilized, and mulched when each stockpile is
9 completed and as directed by the Engineer in accordance with Section 02920,
10 RECLAMATION AND REVEGETATION.

11
12 PLACING CRUSHED SURFACING:

13
14 Place crushed surfacing base course and top course at locations shown on the Drawings.
15 Placement shall conform to Section 4-04.3 of the Standard Specifications.

16
17 PLACING DRAIN GRAVEL AND OPERATIONS LAYER OVER GEOSYNTHETICS:

18
19 Place material over geosynthetics as specified in Sections 02371, GEOTEXTILES; 02661,
20 GEOMEMBRANES; and 02667, GEOSYNTHETIC CLAY LINER (GCL).

21
22 Compaction requirements for drain gravel around pipes and the sumps are specified in
23 Section 02320, TRENCH BACKFILL.

24
25 Operations layer within lining system limits, except as specified for SLDS sump area, shall
26 be placed in 12-inch thick lifts and track-walked into place with a minimum two passes with
27 a Caterpillar D6M-LGP or equal. Operations layer material within SLDS sump area shall be
28 placed in 12-inch thick lifts and compacted to 90 percent relative compaction. Operations
29 layer placed outside edge of liner, such as for shine berm, shall be placed in maximum 8-inch
30 thick lifts and compacted to 95 percent relative compaction.

31
32 Place material to the lines and grades shown and compact by tracking a minimum two passes
33 with spreading equipment.

34
35 QUARRY SPALLS PLACEMENT:

36
37 Quarry spalls shall be placed around the ends of stormwater pipes to provide erosion
38 protection in accordance with the Plans and as directed by the Engineer. Quarry spalls shall
39 be placed in such a manner that all relatively large stones are essentially in contact with each
40 other and voids are filled with the finer materials to provide a well graded compact mass.
41 Finished surface shall be free from irregularities. The stone shall be dumped on the ground in
42 a manner that will ensure the stone attains its specified thickness in one operation. When
43 dumping or placing, care shall be used to avoid damaging the underlying material. Stone
44 shall not be dumped from height greater than 12 inches above surface. Material placement
45 shall be started from the bottom of the installation, working toward edges. Geotextile

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1 damaged during the placement of quarry spalls shall be repaired at Construction General
2 Contractor's sole expense.

3

4 CONSTRUCTION QUALITY CONTROL:

5

6 The Construction General Contractor shall perform in-place density and moisture content
7 tests with own qualified personnel or with a qualified independent testing laboratory as
8 specified in paragraph CONSTRUCTION QUALITY ASSURANCE, to be observed by the
9 Construction Manager, on the following minimum schedule:

10

11 Material Placed by Stockpile (Upper 2 Feet): One per 10,000 ft² per lift.

12

13 Construction General Contractor shall submit qualifications of personnel or independent
14 testing laboratory that will perform construction quality control.

15

16 END OF SECTION 02315

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1 SECTION 02319--SUBGRADE PREPARATION

2

3 PART 1--GENERAL

4

5 WORK INCLUDED:

6

7 This section describes requirements for preparation of subgrades in areas to receive fill.

8

9 REFERENCES:

10

11 The following is a list of standards which may be referenced in this section:

12

13

ASTM INTERNATIONAL (ASTM)

14

15

ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using
Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

16

17

18 DEFINITIONS:

19

20 Optimum Moisture Content: As defined in Section 02315, FILL AND BACKFILL.

21

22 Prepared Ground Surface: Ground surface after completion of clearing and grubbing,
23 scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of
24 subgrade.

25

26 Relative Compaction: As defined in Section 02315, FILL AND BACKFILL.

27

28 SLDS: Secondary Leak Detection System.

29

30 Subgrade: Layer of existing soil after completion of excavation to grade prior to placement of
31 fill, roadway structure or base for floor slab.

32

33 Proof-Rolling: Testing of subgrade as specified herein to identify soft or loose zones
34 requiring correction.

35

36 SEQUENCING AND SCHEDULING:

37

38 Complete applicable Work specified in Section 02316, EXCAVATION, prior to subgrade
39 preparation.

40

41 CONSTRUCTION QUALITY ASSURANCE:

42

43 The CQA Certifying Engineer shall determine in-place density and moisture for subgrade
44 preparation as specified in Section 02315, FILL AND BACKFILL.

45

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- 1 CQA requirements for geomembrane subgrade preparation are specified in Section 02661,
2 GEOMEMBRANES.
3
4 PART 2--PRODUCTS (NOT USED)
5
6 PART 3--EXECUTION
7
8 GENERAL:
9
10 Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
11
12 Bring subgrade to proper grade and cross-section as shown on the Drawings, and uniformly
13 compact surface.
14
15 Maintain prepared ground surface in finished condition until next course is placed.
16
17 PREPARED SUBGRADE FOR ROADWAY, EMBANKMENT, AND STRUCTURES:
18
19 After completion of excavation and prior to foundation, road fill, structural fill or
20 embankment construction, compact prepared subgrade to 95 percent relative compaction.
21 Scarify and moisture condition subgrade soil as required to achieve specified compaction. If
22 soft or loose zones are found, correct as specified herein. Proof-roll subgrade with a fully
23 loaded dump truck or equal to detect soft or loose subgrade or unsuitable material.
24
25 PREPARED SUBGRADE FOR ADMIX LINER:
26
27 Prior to admix liner placement, subgrade shall be backbladed to remove loose soil. Low spots
28 or erosion rills shall be backfilled with structural fill as specified herein. Compact prepared
29 subgrade to 95 percent relative compaction. Scarify and moisture condition subgrade soil as
30 required to achieve specified compaction. If soft or loose zones are found, correct as
31 specified herein. Proof-roll subgrade with a vibratory drum roller or equal to detect soft or
32 loose subgrade or unsuitable material. After compaction and proof-rolling, scarify subgrade
33 surface of 3H:1V side slopes to a minimum depth of 1/2 inch prior to admix liner placement.
34
35 PREPARED SUBGRADE FOR SECONDARY GEOMEMBRANE (SECONDARY AND
36 SLDS) AND SECONDARY GCL:
37
38 ~~After completion of admix liner placement, prepare the subgrade surface for geomembrane~~
39 ~~placement. At completion of SLDS excavation and grading (SLDS geomembrane) or admix~~
40 ~~liner placement (secondary geomembrane and GCL), prepare the subgrade surface for~~
41 ~~geomembrane or GCL placement. The surface shall not have holes, depressions more than~~
42 ~~1 inch in a 12-inch width, nor protrusions extending above the surface more than 1/2 inch.~~
43 Roll surface with smooth-drum roller to form a firm stable base. Allow for leachate piping
44 and sumps or features as shown on the Drawings.
45

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- 1 CORRECTION:
- 2
- 3 Soft or Loose Subgrade:
- 4
- 5 Adjust moisture content and compact to meet density requirements, or
- 6
- 7 Over excavate and replace with suitable material from the excavation, as specified in
- 8 Section 02315, FILL AND BACKFILL.
- 9
- 10 Unsuitable Material: Over excavate and replace with suitable material from the excavation,
- 11 as specified in Section 02315, FILL AND BACKFILL. Dispose of unsuitable material
- 12 excavation in accordance with Article DISPOSAL OF SPOIL in Section 02316,
- 13 EXCAVATION.
- 14
- 15 END OF SECTION 02319

02373 – Table 1 - Required Geonet Properties
02373 – Table 2 - Required CDN Properties

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Table 1. REQUIRED GEONET PROPERTIES

<u>Property</u>	<u>Qualifier</u>	<u>Unit</u>	<u>Value</u>	<u>Test</u>
Polymer Composition	Minimum	% polyethylene	95	---
Resin Specific Gravity	Minimum	N/A	0.92	ASTM D1505
Carbon Black Content	Range	%	2 - 3	ASTM D1603 or D4218
Nominal Thickness	MARV	mils	250	ASTM D1777 or D5199
Nominal Transmissivity ⁽¹⁾	MARV	m ² /sec	3 x 10 ⁻³	ASTM D4716

Table 2. REQUIRED CDN PROPERTIES

<u>Property</u>	<u>Qualifier</u>	<u>Unit</u>	<u>Value</u>	<u>Test</u>
Ply Adhesion	ARV	lb/in	1.0	ASTM D413 or GRI-GC7
Transmissivity ⁽¹⁾	MARV	m ² /sec	5 x 10 ⁻⁴	ASTM D4716

Notes:

MARV = Minimum Average Roll Value.

ARV = Average Roll Value.

⁽¹⁾The design transmissivity is the hydraulic transmissivity of the CDN measured using water at 70 degrees F ±3 degrees F with a hydraulic gradient of 0.1, under the compressive stress of 10,000 psf. Transmissivity value shall be measured between two steel plates 15 minutes after application of the confining stress in the machine direction.

02661 – Table 2 – Required Seam Properties

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Table 2. REQUIRED SEAM PROPERTIES
HDPE GEOMEMBRANES

<u>Property</u>	<u>Qualifier</u>	<u>Unit</u>	<u>Specified Value</u>	<u>Test Method</u>
Shear Strength ¹	minimum	lb/in width	90% of tensile strength at yield as listed in tables in this section	ASTM D6392
Peel Adhesion	minimum	lb/in width	60% of tensile strength at yield as listed in tables in this section and FTB ²	ASTM D6392

13 ¹Also called "Bonded Seam Strength."

14 ²FTB = Film Tear Bond (failure occurs through intact geomembrane, not through seam).

11305-01 Sump Pump Data Sheet – 1 of 2

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1 SUMP PUMP DATA SHEET, 11305-01
2
3
4 Tag Numbers: 219A-LH-P-207, 219E-LH-P-207
5
6 Pump Locations and I.D.: Buildings 219A and 219E, Combined Sump Pump
7
8 Manufacturer and Model Number: (1) Hydromatic Pump Co.; Model SB3S
9 (2) Barnes
10 (3) Or approved equal
11
12 SERVICE CONDITIONS:
13
14 Liquid Pumped (Material and Percent): Leachate from low-level radioactive waste
15 disposal facility and rain/snow melt
16
17 Pumping Temperature (Fahrenheit): Normal: 55 Max 130 Min 27
18
19 Specific Gravity at 60 Degrees F: 1.0 Viscosity Range: NA pH: 5-9
20
21 Abrasive (Y/N) Y (fine/coarse soil particles) Possible Scale Buildup (Y/N): Y
22
23 Total suspended solids (mg/L) 200 (estimated)
24
25 Largest diameter solid pump can pass (inches) 0.5
26
27 PERFORMANCE REQUIREMENTS:
28
29 Capacity (US gpm): Rated: 250
30
31 Total Dynamic Head (Ft): Rated: 19
32
33 Maximum Shutoff Pressure (Ft): 50
34
35 Min. Rated Pump Hydraulic Efficiency at Rated Capacity (%): 50
36
37 Max. Pump Speed at Rated Capacity (rpm): 1,750
38
39 Constant (Y/N): Y Adjustable (Y/N): N
40

11305-01 Sump Pump Data Sheet – 2 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0

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17
18
19
20
21

DESIGN AND MATERIALS:

Pump Type: Heavy-Duty Nonclog (Y/N) Y

Volute Material: Cast Iron ASTM A48

Pump Casing Material: Cast Iron ASTM A48

Motor Housing Material: Cast Iron ASTM A48

INDUCTION DRIVE MOTOR:

Horsepower: 3 Voltage: 460 Phase: 3 Speed (rpm): 1,750

Service Factor: 1.15 Inverter Duty (Y/N): N

Motor nameplate horsepower shall not be exceeded at any head-capacity point on the pump curve.

Enclosure: Explosion-proof, submersible, Class 1, Div. 2, Groups C and D

11305-02 Sump Pump Data Sheet – 1 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0

1 SUMP PUMP DATA SHEET, 11305-02
2
3
4 Tag Numbers: 219A-LH-P-205, 219E-LH-P-205
5
6 Pump Locations and I.D.: Buildings 219A and 219E, Floor Sump
7
8 Manufacturer and Model Number: (1) Hydromatic Pump Co.
9 (2) Barnes
10
11 SERVICE CONDITIONS:
12
13 Liquid Pumped: Leachate from low-level radioactive waste disposal facility
14
15 Pumping Temperature (Fahrenheit): Normal: 55 Max 130 Min 27
16
17 Specific Gravity at 60 Degrees F: 1.0 Viscosity Range: NA pH: 5-9
18
19 Abrasive (Y/N) Y (fine/coarse soil particles) Possible Scale Buildup (Y/N): Y
20
21 Total suspended solids (mg/L) 200 (estimated)
22
23 Largest diameter solid pump can pass (inches) 0.5
24
25 PERFORMANCE REQUIREMENTS:
26
27 Capacity (US gpm): Rated: 28
28
29 Total Dynamic Head (Ft): Rated: 14
30
31 Maximum Shutoff Pressure (Ft): 30
32
33 Min. Rated Pump Hydraulic Efficiency at Rated Capacity (%): 45
34
35 Max. Pump Speed at Rated Capacity (rpm): 1,750
36
37 Constant (Y/N): Y Adjustable (Y/N): N
38

11305-02 Sump Pump Data Sheet – 2 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0

1 DESIGN AND MATERIALS:

2

3

Pump Type: Heavy-Duty Nonclog (Y/N) Y

4

Volute Material: Cast Iron ASTM A48

5

6

Pump Casing Material: Cast Iron ASTM A48

7

8

Motor Housing Material: Cast Iron ASTM A48

9

10

11 INDUCTION DRIVE MOTOR:

12

13

Horsepower: 0.30 Voltage: 460 Phase: 3 Speed (rpm): 1,750

14

15

Service Factor: 1.15 Inverter Duty (Y/N): N

16

17

Motor nameplate horsepower shall not be exceeded at any head-capacity point on the pump curve.

18

19

20

Enclosure: Submersible

11306 01 Leachate Pump Data Sheet – 1 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 LEACHATE PUMP DATA SHEET, 11306-01:
2
3
4 Tag Numbers: 219A-LH-P-202, 219E-LH-P-202
5
6 Pump Locations and I.D.: Cell 1 LCRS Sump, Low Flow
7 Cell 2 LCRS Sump, Low Flow
8
9 Manufacturer and Model Number: (1) EPG Companies; Model WSD 3-3
10 (2) Or equal
11
12 SERVICE CONDITIONS:
13
14 Liquid Pumped (Material and Percent): Leachate from low-level radioactive waste
15 landfill
16
17 Pumping Temperature (Fahrenheit): Normal: 55 F Max: 130 F Min: 27 F
18
19 Specific Gravity at 60 Degrees F: 1.0 Viscosity Range: NA pH: 5-9
20
21 Abrasive (Y/N) Y (infrequent fine soil particles) Possible Scale Buildup (Y/N): Y
22
23 Total Suspended Solids (mg/l): 200 (estimated)
24
25 PERFORMANCE REQUIREMENTS AT PRIMARY DESIGN POINT:
26
27 Capacity (US gpm): Rated: 13
28
29 Total Dynamic Head (Ft): Rated: 66
30
31 Min. Hydraulic Efficiency (%): 60
32
33 Maximum Shutoff Pressure (Ft): 90
34
35 Max. Pump Speed at Design Point (rpm): 3,450
36
37 Constant (Y/N): Y Adjustable (Y/N): N

11306-01 Leachate Pump Data Sheet – 2 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 DESIGN AND MATERIALS:
2
3 Design: Wheeled enclosure frame Back Pullout (Y/N) Y
4
5 Discharge Orientation: Center
6
7 Casing Materials: Type 304 SST
8
9 Case Wear Ring (Y/N) NA Material: NA
10
11 Impeller: Type: Closed Material: Type 304 SST
12
13 Impeller Wear Ring (Y/N): Y Material: E-Glide (engineered plastic) or equal
14
15 Shaft Material: Type 304 SST Shaft Sleeve Material: E-Glide or equal
16
17 Shaft Seal: Y Ring Material: E-Glide or equal Lubrication: Fluid
18
19 AFBMA B-10 Bearing Life (Hrs): NA Lubrication: NA
20
21 Drive Type: Direct Coupled
22
23 INDUCTION DRIVE MOTOR:
24
25 Horsepower: 0.5 Voltage: 460 Phase: 3
26
27 Speed (rpm): 3,450
28
29 Service Factor: 1.15 Inverter Duty (Y/N) N
30
31 Motor nameplate horsepower shall not be exceeded at any head-capacity point on the
32 pump curve.
33
34 Enclosure: Submersible

11306-02 Leachate Pump Data Sheet – 1 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 LEACHATE PUMP DATA SHEET, 11306-02:

2
3

4 Tag Numbers: 219A-LH-P-203, 219E-LH-P-203

5

6 Pump Location and I.D.: Cell 1 LCRS Sump, High Flow

7 Cell 2 LCRS Sump, High Flow

8

9 Manufacturer and Model Number: (1) EPG Companies; Model WSD 30-4

10 (2) Or equal

11

12 SERVICE CONDITIONS:

13

14 Liquid Pumped (Material and Percent): Leachate from low-level radioactive waste

15 landfill

16

17 Pumping Temperature (Fahrenheit): Normal: 55 F Max: 130 F Min: 27 F

18

19 Specific Gravity at 60 Degrees F: 1.0 Viscosity Range: NA pH: 5-9

20

21 Abrasive (Y/N) Y (infrequent fine soil particles) Possible Scale Buildup (Y/N): Y

22

23 Total Suspended Solids (mg/l): 200 (estimated)

24

25 PERFORMANCE REQUIREMENTS AT PRIMARY DESIGN POINT:

26

27 Capacity (US gpm): Rated: 155

28

29 Total Dynamic Head (Ft): Rated: 118

30

31 Min. Hydraulic Efficiency (%): 60

32

33 Maximum Shutoff Pressure (Ft): 208

34

35 Max. Pump Speed at Design Point (rpm): 3,450

36

37 Constant (Y/N): Y Adjustable (Y/N): N

11306-02 Leachate Pump Data Sheet – 2 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 DESIGN AND MATERIALS:
2
3 Design: Wheeled enclosure frame (Y/N) Y
4
5 Discharge Orientation: Center
6
7 Casing Materials: Type 304 SST
8
9 Case Wear Ring (Y/N) NA Material: NA
10
11 Impeller: Type: Closed Material: Type 304 SST
12
13 Impeller Wear Ring (Y/N): Y Material: E-Glide (engineered
14 plastic), or equal
15
16 Shaft Material: Type 304 SST Shaft Sleeve Material: E-Glide (engineered
17 plastic), or equal
18
19 Shaft Seal: Y Ring Material: E-Glide or equal Lubrication: Fluid
20
21 AFBMA B-10 Bearing Life (Hrs): NA Lubrication: NA
22
23 Drive Type: Direct Coupled
24
25 INDUCTION DRIVE MOTOR:
26
27 Horsepower: 7.5 Voltage: 460 Phase: 3
28
29 Speed (rpm): 3,450
30
31 Service Factor: 1.15 Inverter Duty (Y/N) N
32
33 Motor nameplate horsepower shall not be exceeded at any head-capacity point on the
34 pump curve.
35
36 Enclosure: Submersible

11306-03 Leachate Pump Data Sheet – 1 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 LEACHATE PUMP DATA SHEET, 11306-03:
2
3
4 Tag Numbers: 219A-LH-P-204, 219E-LH-P-204
5
6 Pump Locations and I.D.: Cell 1 LDS Sump
7 Cell 2 LDS Sump
8
9 Manufacturer and Model Number: (1) EPG Companies; Model WSD 1.5-3
10 (2) Or equal
11
12 SERVICE CONDITIONS:
13
14 Liquid Pumped (Material and Percent): Leachate from low-level radioactive waste
15 landfill
16
17 Pumping Temperature (Fahrenheit): Normal: 55 F Max: 130 F Min: 27 F
18
19 Specific Gravity at 60 Degrees F: 1.0 Viscosity Range: NA pH: 5-9
20
21 Abrasive (Y/N) Y (infrequent fine soil particles) Possible Scale Buildup (Y/N): Y
22
23 Total Suspended Solids (mg/l): 200 (estimated)
24
25 PERFORMANCE REQUIREMENTS AT PRIMARY DESIGN POINT:
26
27 Capacity (US gpm): Rated: 4
28
29 Total Dynamic Head (Ft): Rated: 65
30
31 Min. Hydraulic Efficiency (%): 60
32
33 Maximum Shutoff Pressure (Ft): 80
34
35 Max. Pump Speed at Design Point (rpm): 3,450
36
37 Constant (Y/N): Y Adjustable (Y/N): N

11306 -03 Leachate Pump Data Sheet – 2 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 DESIGN AND MATERIALS:
2
3 Design: Wheeled enclosure frame Back Pullout (Y/N) Y
4
5 Discharge Orientation: Center
6
7 Casing Materials: Type 304 SST
8
9 Case Wear Ring (Y/N) NA Material: NA
10
11 Impeller: Type: Closed Material: Type 304 SST
12
13 Impeller Wear Ring (Y/N): Y Material: E-Glide (engineered plastic) or equal
14
15 Shaft Material: Type 304 SST Shaft Sleeve Material: E-Glide or equal
16
17 Shaft Seal: Y Ring Material: E-Glide or equal Lubrication: Fluid
18
19 AFBMA B-10 Bearing Life (Hrs): NA Lubrication: NA
20
21 Drive Type: Direct Coupled
22
23 INDUCTION DRIVE MOTOR:
24
25 Horsepower: 0.5 Voltage: 460 Phase: 3
26
27 Speed (rpm): 3,450
28
29 Service Factor: 1.15 Inverter Duty (Y/N) N
30
31 Motor nameplate horsepower shall not be exceeded at any head-capacity point on the
32 pump curve.
33
34 Enclosure: Submersible
35

11312-01 Centrifugal Pump Data Sheet – 1 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 HORIZONTAL END SUCTION CENTRIFUGAL PUMP DATA SHEET, 11312-01:
2
3
4 Tag Numbers: 219A1-LH-P-302, 219E1-LH-P-302
5
6 Pump Name: Buildings 219A1 and 219E1, Leachate Transfer Pump
7
8 Manufacturer and Model Number: (1) Paco; Model 30707
9 (2) Or equal
10
11 SERVICE CONDITIONS:
12
13 Liquid Pumped (Material and Percent): Leachate from low-level radioactive waste
14 landfill
15
16 Pumping Temperature (Fahrenheit): Normal: 55 Max 130 Min 27
17
18 Specific Gravity at 60 Degrees F: 1.0 Viscosity Range: NA pH: 5-9
19
20 Abrasive (Y/N) Y (fine soil particles) Possible Scale Buildup (Y/N): Y
21
22 Total suspended solids (mg/L) 200 (estimated)
23
24 Largest diameter solid pump can pass (inches) 0.25
25
26 PERFORMANCE REQUIREMENTS AT PRIMARY DESIGN POINT:
27
28 Capacity (US gpm): Rated: 250
29
30 Total Dynamic Head (Ft): Rated: 25
31
32 Min. Hydraulic Efficiency (%): 75
33
34 Maximum Shutoff Pressure (Ft): 40
35
36 Max. Pump Speed at Design Point (rpm): 1,750
37
38 Constant (Y/N): Y Adjustable (Y/N): N
39

11312- 01 Centrifugal Pump Data Sheet – 2 of 2

Project Title: Integrated Disposal Facility
Document Type: Construction Specifications (C-1)
RPP-18489, Rev. 0A

1 DESIGN AND MATERIALS:
2
3 ANSI (Y/N) Y Standard (Y/N) Y Design: Frame-mounted (Y/N) Y
4
5 Close-Coupled Casing (Y/N) N Back Pullout (Y/N) Y
6
7 Discharge Orientation: 12:00 Rotation (view from end coupling): CW
8
9 Shaft Seal: Packing (Y/N) N
10
11 Mechanical (Y/N) Y
12
13 Lubrication: Process water
14
15 Drive Type: Direct-Coupled: Y Belt N Adjustable Speed N
16
17 INDUCTION DRIVE MOTOR:
18
19 Horsepower: 3 Voltage: 460 Phase: 3 Speed (rpm): 1,750
20
21 Service Factor: 1.15 Inverter Duty (Y/N) N
22
23 Motor nameplate horsepower shall not be exceeded at any head-capacity point on the
24 pump curve.
25
26 Enclosure: Totally enclosed fan cooled
27
28 Mounting Type: Horizontal Y Nonreverse Ratchet (Y/N) N
29
30 TESTING:
31
32 Pump Tests: Factory Functional (Y/N) N Field Performance (Y/N) N
33
34 Factory Hydrostatic Casing Pressure Test (Y/N) N
35
36 Field Functional (Y/N) Y Field Performance (Y/N) N
37
38 Field Vibration (Y/N) Y