Tennessee Valley Authority
Watts Bar Fossil Plant

CLOSURE AND POST-CLOSURE PLAN

SLAG PROCESSING AND POND AREA

Prepared By:

Tennessee Valley Authority
Fossil Engineering Services
1101 Market Street
Chattanooga, TN 37401-2801

April 2007

Title: CLOSURE AND POST-CLOSURE PLAN SLAG PROCESSING AND POND AREA.			DCN#
			Plant/Unit: Watts Bar Fossil Plant
Vendor	Contract No.	Key Nouns:	

Applicable Design Documents	REV	EDMS NUMBER	DESCRIPTION
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References	R1		
	R2		

TENNESSEE VALLEY AUTHORITY
FOSSIL POWER GROUP
FOSSIL ENGINEERING SERVICES
SITE AND ENVIRONMENTAL ENGINEERING

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Date	April 2007		
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1.0 INTRODUCTION

1.1 Purpose

The following Closure and Post-Closure Plan (C/PC Plan) has been developed for the Slag Processing and Pond Area located at Tennessee Valley Authority's (TVA's) Watts Bar Fossil Plant (WBF). Closure and post closure activities will be conducted in accordance to the current standards adopted by the Tennessee Department of Environment and Conservation (TDEC). The purpose of this document is to: (i) describe necessary activities associated with the closure of the disposal facility; and (ii) describe the monitoring and maintenance activities for the facility during the post-closure period. A copy of this C/PC Plan will be kept at the facility, or another approved location.

1.2 Site Location and Description and History

1.2.1 Location The slag processing and pond area is located on land currently owned by TVA at the Watts Bar Fossil Plant (WBF). WBF is located on the west bank of the Tennessee River near Spring City in Rhea County, TN (see Appendix A). Access to the Site is via a shared access road to Watts Bar Nuclear Plant. The intersection of the access road is located approximately 1 mile west of Watts Bar Dam off Highway 68.

1.2.2 History The Watts Bar Fossil Plant was built with four operating units rated at 60,000 kilowatts of rated capacity. Major operations of the plant began when the first unit went into commercial operations on February 15th, 1942 with the final unit beginning commercial operations on April 8th, 1945. The plant played a key role as a part of the World War II emergency program. The Watts Bar Fossil Plant ceased operation in 1982.

The slag processing and pond area is located as shown in Figure 1 in Appendix A, and covers an area of approximately 27 acres. Within this area is the original ash pond which received sluiced fly ash. Bottom ash in the form of slag was also disposed of in this area. (In 1978 the ash pond extension to the south was added via a series of culverts underneath the road to the south of this area. It is noted that this extended

portion of the ash pond is not being closed.) In 1978 a chemical treatment pond (1.1 acres) was added in the northwest corner of this area. This pond was designed to receive the output of periodic acidic boiler cleaning treatments; the planned output being neutralized before discharging into the ash pond. It is unknown if this pond was ever used for that purpose as four years later the Watts Bar Fossil Plant ceased operation in 1982.

While the plant was in deactivated status no ash was discharged into this area however raw water continued to be discharged into the bottom ash area for various reasons. During a portion of this period TVA used part of the dry area for storage of heavy construction equipment. US Minerals reclaimed slag from this area from March 1996 until December 2005. This recovered aggregate material was used in the manufacture of products as varied as roofing shingles and toothpaste. Those operations ceased when all the usable material was recovered. Since the area is no longer being used as a processing pond and no more material can be reclaimed for other use, it is to be closed.

1.3 Expected Year of Closure

TVA expects to complete the closure of the slag area in 2008.

1.4 Facility Contact Information

The following is a list of responsible parties involved in the permitting, design, operation, maintenance, quality control and quality assurance of the slag disposal facility at TVA's Watts Bar Fossil Plant.

1. Owner: Tennessee Valley Authority (TVA)
   Contact: Facilities Manager
   Tennessee Valley Authority
   400 W. Summit Hill Drive, WT 3B-K
   Knoxville, TN 37902

As of the date of this revision, the plant is unmanned. TVA's facilities' management contact for this project is Mr. Larry Graves, (865)632-8924

Please direct any correspondence in regards to this document to the designated Solid Waste Specialist. The Solid Waste Specialist for Watts Bar Fossil Plant is:

John Dizer
1101 Market Street, LP 5D-C
Chattanooga, Tennessee 37402-2801
Phone: (423)751-7636
Fax: (423)751-7011

2. State: Tennessee Department of Environment and Conservation
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
540 McCallie Avenue
Suite 550- State Office Bldg
Chattanooga, TN 37402
Phone: (423) 634-5745
Fax: (423) 634-6389

Contact as of the date of this manual is Mr. Guy Moose, Management of Solid (Trash) & Hazardous Wastes

Tennessee Department of Conservation
Division of Solid Waste Management
Central Office
401 Church Street
5th Floor, L&C Tower
Nashville, TN 37243-1533
Phone: (615) 532-0780
Fax: (615) 532-0886

Contact as of the date of this manual is Mr. Mike Apple, Division Director.

2.0 CLOSURE PLAN

Though the slag processing and pond area was not subject to a solid waste disposal operating permit, closure and post closure information presented in this document has been organized and presented consistent with the permit application standards presented in Rule 1200-1-7-.04 (8) (d) and Rule 1200-1-7-.03 (2). Sections within this document have been titled and enumerated consistent with the regulations to facilitate the review process. The regulatory requirements are cited in italics at the start of each section followed by a text description indicating how the specific requirement has been or will be addressed.

2.1 Closure Requirements (ref. 1200-1-7-.04 (8))

Regulatory requirement:

(a) General Performance Standard

1. *The operator must close the disposal facility or disposal facility parcel in a manner that:*

   (i) Minimizes the need for further maintenance; and
   (ii) Controls, minimizes, or eliminates, to the extent necessary to prevent threats to public health and the environment, post-closure escape of solid waste, solid waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

2. *The operator must care for a disposal facility or disposal facility parcel for the period of time after closure, specified in subparagraph (d) of this Rule, in a manner that assures that the performance objectives of part 1 of this subparagraph are continuously met.*

This Closure Plan provides direction to close the slag processing and pond facility in a manner that will minimize the need for further maintenance of the facility. It further specifies measures to control, minimize, or eliminate threats to public health and the environment.

(a) Adherence to plan - The operator must initiate and complete closure activities and conduct post-closure care activities in accordance with the approved closure/post-closure care plan, if such plan has been prepared and approved for the disposal facility or disposal facility parcel being closed.

The operator will initiate and complete closure activities and conduct post-closure activities in accordance with the approved closure and post-closure plan at the time of closure of the facility.

(b) Closure Requirements - The following requirements apply to active portions of the facility:

1. *The operator must notify the Division Director of his intent to close at least 60 days prior to the date he expects to begin final closure of the disposal facility or disposal facility parcel.*

2. *The operator must complete closure activities including grading and establishing vegetative cover in the shortest practicable time, not to exceed 180 days, after any fill areas or any portion of the fill areas have achieved final grade, unless the Commissioner allows otherwise in the permit. Permits may provide, or be modified to provide, minimum areas for closure which will be shown in closure plans. Such modifications of closure plans, for the sole purpose of identifying minimum closure areas, shall be deemed minor modifications. When these complete closure areas reach final grade, these areas shall be closed as otherwise provided in this part and within the 180 day time frame provided herein.*

By the submission of this plan TVA hereby notifies the Director of the Tennessee Division of Solid Waste Management of its intent to close the facility. The closure activities (including final cover placement, grading, drainage) will be completed within

180 days following the beginning of closure activities, except where an extension is requested and approved by the Tennessee Division of Solid Waste Management. It should be noted that the native grasses require they be planted in the early spring. Therefore the total closure will not be complete until summer of 2008.

2.2 Final Cover and Alternative Final Cover Systems (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

3. *Unless otherwise noted in the permit a depth of compacted final cover material (e.g., soil) shall be placed on the disposal facility or disposal facility parcel in the shortest practicable time, not to exceed 90 days, after achieving final grade of any fill area or any portion of a fill area. At least the top twelve inches of this cover material shall be soil which will support the growth of suitable vegetation (e.g., topsoil).*

   (i) At Class I and Class II facilities the depth of final cover system shall be at least 36 inches of soil of which a minimum of 12 inches shall be for the support of vegetative cover.

   The design of the final cover system shall be such that the infiltration volume of water will be equal to or less than the percolation volume through the bottom liner system or a design which includes a compacted soil layer of at least 24 inches which has a permeability no greater than 1×10^{-7} cm/sec, whichever is less. This design shall be supported by the use of the HELP model or other equivalent method approved by the Commissioner.

   An alternate final cover system may be used provided that it is demonstrated to the satisfaction of the Commissioner that the final cover system provides equivalent or superior performance to the minimum performance standard in this subpart.

(ii) At Class III and Class IV facilities, unless the Commissioner determines that a greater depth is needed to achieve the general performance standard of subparagraph (a) of this paragraph, the depth of final cover shall be at least 30 inches of compacted soil. The final cover consists of an 18 inch low permeability layer overlain by a 12 inch protective layer.

(iii) At Class I, II, III, and IV facilities, with approval of the Commissioner any other low permeability layer construction techniques or materials may be used to provide the final cover, provided that it provides equivalent or superior performance to the requirements of this part.

One final cover system is proposed for the primary slag processing and pond area. Another final cover system is proposed for the former Chemical Pond Area.

2.2.1 Final Cover for the Slag Processing and Pond Area.

Details of the final cover system for this area are illustrated on Drawing No. 10W425-06 (Slag Disposal Details I). As shown in the drawing, the final cover system will consist of the following profile, from top to bottom:

- a 12-inch thick protective cover soil (vegetative cover) that is capable of sustaining native plant growth;

- a 12-inch thick compacted soil layer. The soil source is to be a soil that has shown to be capable of achieving a hydraulic conductivity of less than or equal to 1×10^{-6} cm/sec. See Appendix E (QA/QC) section 6.4 for testing requirements.

The proposed final cover with a compacted layer achieving the specified hydraulic conductivity exceeds the performance requirements stated in DSWM Policy Memorandum #93 (see Appendix B) for a coal ash disposal facility. This area has been open for more than 60 years. The chemical testing of the various waste materials in this area, included in Appendix G, shows these materials to be of relatively low hazard. The regrading and addition of the proposed final cover will greatly reduce infiltration thru the waste material in this area.

- The final cover grading plan for this area is presented in Drawing No. 10W425-03 (Site Grading Plan (Slag Area)). As shown in this drawing, the final cover will be graded to a minimum slope of 2 percent and a maximum slope of 20 percent.

2.2.2 Final Cover for the Chemical Pond Area.

Details of the final cover system for this area are illustrated on Drawing No. 10W425-07 (Slag Disposal Details II). As shown in the drawing, the final cover system will consist of the following profile, from top to bottom:

- a 12-inch thick protective cover soil (vegetative cover) that is capable of sustaining native plant growth;

In TVA's records there is no indication that the chemical pond was ever used. This is quite conceivable in light of the fact that the plant was decommissioned approximately four years after the Chemical Treatment pond was constructed. Boiler cleanings at our other fossil plants are more typically on 5 year or even greater intervals. In the final years of operation the plant was only intermittently operated. Furthermore, the sediment was tested and no significant contamination was found. The results of that testing is included in Appendix G.

- The final cover grading plan for this area is presented in Drawing No. 10W425-03 (Site Grading Plan (Slag Area)). As shown in this drawing, the final cover will be graded to a minimum slope of 2 percent following filling in the pond to grade with select fly ash from the adjacent processing area.

2.3 Drainage System (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

4. *The final surface of the disposal facility or disposal facility parcel shall be graded and/or provided with drainage facilities in a manner that:*

   (i) Minimizes precipitation run-on from adjacent areas onto the disposal facility or disposal facility parcel;
   (ii) Minimizes erosion of cover material (e.g., no steep slopes);
   (iii) Optimizes drainage of precipitation falling on the disposal facility or disposal facility parcel (e.g., prevent pooling); and
   (iv) Provides a surface drainage system which is consistent with the surrounding area and in no way significantly adversely affects proper drainage from these adjacent lands.

The proposed grading plan of the drainage system (surface water management system) for the TVA Watts Bar Slag Processing and Pond Area is provided in Drawing No. 10W425-3. Runoff from primarily undisturbed areas to the north of the disposal area (referred to as "run-on") will be intercepted by a system of pre-existing drainage channels to prevent from "running-on" to the active portion of the disposal area. The run-on from the parking area adjacent to the former powerhouse will be re-directed into a ditch west of the slag processing area. This system of drainage channels will collect and convey run-on to the Tennessee River to the south of the disposal area, through the remaining ash pond which will serve as a retention pond.

Once closed, the majority of the former slag area will continue to drain to the south through the ash pond and will outlet thru the existing weirs into the Tennessee River thru an existing NPDES discharge point. Approximately 3.4 acres of the northernmost portion of the area will be directed to a new sedimentation/retention basin and will be directed into the Tennessee River through a new NPDES permitted discharge. Approximately 3.2 acres located on the eastern side of the final closed area will sheet flow directly to the Tennessee River.

Erosion of soil material on the final cover system will be minimized through slope stabilization techniques. The majority of the final cover slope will be graded at 2%. A portion of the final cover side slopes will be graded not to exceed a 20 percent (i.e., 5 horizontal: 1 vertical) slope. The maximum slope length of the steepest slope (between drainage benches) is 75 feet. (Only a small portion of a run-on diversion ditch side

slope is set at 33% (3:1) at a location that does not receive final cover) The cover system optimizes drainage and precipitation run-off by maintaining minimum top slopes of 2 percent to prevent ponding of water on top of the cover. The new stormwater pond at the north of the closed area has been designed to accommodate at least a 25-year, 24-hour storm event. Calculations for the new stormwater pond are included in Appendix F. Calculations verify that existing spillway structures for the existing ash pond south of the area are sufficient for a 25-year 24-hour storm event. The surface water management system has been designed to be consistent with the surrounding area and does not significantly affect proper drainage from or to adjacent lands.

In addition, vegetation will be established on the final cover system surface as the construction progresses to prevent erosion of final cover material.

2.4 Vegetative Cover (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

5. *In order to minimize soil erosion, as soon as practicable after final grading, the operator shall take steps as necessary to establish a protective vegetative cover of acceptable grasses over disturbed areas of the site. These steps shall include seeding, mulching, and any necessary fertilization at a minimum, and may include additional activities such as sodding of steeper slopes and drainage ways if such are necessary.*

As soon as practical after final grading, the operator will take necessary steps to establish a protective vegetative cover of acceptable grasses over disturbed areas of the site. These steps shall include seeding, mulching, and any necessary fertilization at a minimum, and may include additional activities such as sodding of steeper slopes and drainage ways if necessary. Application rates for seeding and fertilizing of indigenous grass/vegetation are provided in the Specifications included as Appendix C in this closure plan. Temporary erosion control blankets may be used if necessary to provide seedbed protection and prevent wash-out of seed and fertilizer during vegetation establishment. A temporary cover of a grass seeding such as annual ryegrass may be used as necessary during the construction period to prevent erosion until the final native grass is established.

2.5 Other Erosion and Sediment Control Measures (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

6. *In addition to the drainage and grading requirements and vegetative cover requirements, the operator shall take other measures as may be necessary to minimize and control erosion and sedimentation (e.g., soil stabilization, sediment ponds) at the site.*

In addition to the drainage, grading, and vegetative cover requirements, other measures such as soil stabilization through riprap protection, and sediment ponds will be implemented to minimize and control erosion and sedimentation at the site. Additional erosion control problems will be addressed with appropriate structural and non-structural sediment and erosion control practices as prescribed within the plans or the most recent edition of the Tennessee Erosion and Sediment Control Handbook.

2.6 Leachate Collection System (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

7. *As required in his permit, or as otherwise necessary to prevent threats to human health and the environment, the operator shall establish and/or complete a system for collecting, removing, and treating leachate generated by the disposal facility or disposal facility parcel.*

This facility is a slag processing area that does not have a leachate collection system. Leachate collection for ash disposal facilities is not applicable as so stated in DSWM Policy memorandum SW-93 (A copy of this Policy Memorandum is included in Appendix B).

2.7 Gas Collection System (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

> *8. As required in his permit, or as otherwise necessary to prevent threats to human health and the environment, the operator shall establish and/or complete a system for collecting and venting or otherwise controlling the vertical and horizontal escape of gases generated in the disposal facility or disposal facility parcel.*

This facility processed only slag and ash produced from burning coal. Gas collection for ash disposal facilities is not applicable as so stated in DSWM Policy memorandum SW-93 (A copy of this Policy Memorandum is included in Appendix B). Ash produced from the combustion of coal is the primary waste material processed in the facility. Ash is completely composed of noncombustible mineral components. Ash is basically inert, noncombustible, nonputrescible, and will not decompose to produce gases. Rule 1200-1-7-.04 (8) (c) 8 is not applicable to this facility.

2.8 Borrow Area Reclamation

Borrow areas which are used for excavation and construction of final cover soil will be reclaimed by regrading, stabilizing, and establishing permanent vegetation, within 30 days of ceasing borrow activities. Borrow and stockpile areas will be graded to allow positive drainage off-site. Additional erosion controls will be addressed with appropriate structural and non-structural sediment and erosion control practices as prescribed within the plans or the most recent edition of the Tennessee Erosion and Sediment Control Handbook.

2.9 Closure Sequence

Upon achieving the appropriate final grades for the closure, the facility will be closed in the following sequence:

1) An on-site borrow source for soil material has been identified and laboratory tests have been performed to ensure that the properties of that soil satisfy the needs for this project. Portions of the soils report are reproduced in Appendix H. The entire report is available upon request.

2) Closure will then begin by installing the compacted soil layer in a controlled manner in lifts using materials from the designated borrow source. The QA/QC plan will be followed to monitor the consistency and thickness of the compacted soil layer as it is placed.

3) The vegetative soil cover will be installed on top of the compacted soil layer under the supervision of the TVA site construction manager and a professional engineer registered in the State of Tennessee. To aid in root development, this layer will be moderately compacted.

4) Finally, the surface of the cover will be seeded and/or vegetated, and fertilizer will be added to promote germination and growth. Native grasses will be used for the final vegetative cover. Application rates for seeding and fertilizing are provided in the specification for native grasses reproduced in Appendix C.

2.10 Closure Certification and Notification (ref. 1200-1-7-.04 (8) (c))

Regulatory requirement:

9. The operator must notify the Division Director in writing within 60 days of his completion of closure of the disposal facility or disposal facility parcel. Such notification must include a certification by the operator that the disposal facility or disposal facility parcel has been closed in accordance with the approved closure/post-closure care plan. Within 21 days of the receipt of such notice the Division Director shall inspect the facility to verify that closure has been completed and in accordance with the approved plan. Within 10 days of such verification, the Commissioner shall approve

the closure in writing to the operator. Closure shall not be considered final and complete until such approval has been made.

TVA will close the Watts Bar Fossil Plant Disposal Facility in accordance with the closure plan approved by TDEC Division of Solid Waste Management. Upon completing all the requirements outlined in the closure plan, TVA will provide the Division of Solid Waste Management with certification, signed by a professional engineer registered in the State of Tennessee, verifying compliance with closure requirements within 60 days after completing the closure requirements.

3.0 POST-CLOSURE PLAN

3.1 Post-Closure Care Period (ref. 1200-1-7-.04 (8) (a) and (d))

Regulatory requirement:

(a) General Performance Standard

(ii) The operator must care for a disposal facility or disposal facility parcel for the period of time after closure, specified in subparagraph (d) of this Rule, in a manner that assures that the performance objectives of part 1 of this subparagraph are continuously met.

(d) Post-Closure Care Period - For Class I and Class II disposal facilities, post-closure care must continue for 30 years after the date of final completion of closure of the disposal facility or disposal facility or parcel unless a shorter period is established in the approved closure/post-closure care plan. For Class III and IV disposal facilities, post-closure care must continue for 2 years after the date of final completion of closure of the facility or facility parcel. The postclosure care period may be reduced or extended based on cause by amendment of the approved closure/post-closure care plan as provided in rule 1200-1-7-.03(2)(e).

TVA will provide post-closure care for the disposal facility for a period of thirty (30) years after completion of disposal facility closure activities, in accordance with this Post-Closure Plan.

3.2 Post-Closure Care Activities

3.2.1 Final Contours and Drainage System (ref. 1200-1-7-.04 (8) (e))

Regulatory requirement:

(e) Post-Closure Care Activities - During the post-closure care period, the operator must, at a minimum, perform the following activities on closed portions of his facility:

1. Maintain the approved final contours and drainage system of the site such that the objectives of part (c) 4 of this paragraph are continuously met;

The approved final contours and drainage system will be maintained at the site. The effectiveness of the final cover will be maintained by making repairs to the cover as necessary to correct the effects of subsidence and erosion, as well as preventing run-on and run-off from eroding/damaging the final cover system. If settlement or other structural problems occur in the final cover system, the cover will be regraded. The problem area will be stripped of the vegetation layer and fill dirt will be applied to the area. The disturbed area will be covered with soil and reseeded as specified in the design. If excessive surface cracks appear on the soil cover, the cracks will be properly graded with suitable soil and appropriate vegetative cover will be re-established to prevent the infiltration of surface water.

The disposal area final cover has been designed to provide for positive, non-erosive drainage of run-off.

The outlet and inlet structures of the stormwater ponds will be maintained by the operator throughout the life of the disposal facility and during the post-closure period.

3.2.2 Vegetative Cover (ref. 1200-1-7-.04 (8) (e))

Regulatory requirement:

2. Ensure that a healthy vegetative cover is established and maintained over the site.

The vegetative cover will be inspected on a regular basis so as to maintain a healthy stand of vegetation. Areas containing distressed vegetation will be reseeded. The vegetative cover over the site will be maintained by mowing or selective herbicide use

on a regular schedule. If an area has less than 25 percent coverage by grass, the area will be reworked and reseeded. Fertilizer may be applied to promote the re-establishment of a self-sustaining vegetative cover. Significant depressions or gullies that develop will be promptly repaired by filling with soil and seeding. The details of the vegetative cover are provided in the QA/QC plan.

Regulatory requirement:

> 3. *Maintain the drainage facilities, sediment ponds, and other erosion/sedimentation control measures (if such are present at the landfill), at least until the vegetative cover is established sufficiently enough to render such maintenance unnecessary.*

Until vegetation of the final cover is fully established, sediment transport will be retarded by temporary silt fences. Sediment transported from the cover before vegetation is fully established will be conveyed to the stormwater pond. Should excessive cleaning and maintenance of the stormwater pond be needed due to erosion of soil from the cover, temporary sediment control measures will be installed to reduce the sediment load until the vegetative cover is fully established. Stormwater channels will be lined to prevent erosion. Until vegetation is fully established, the channels will be inspected monthly and after major storm events for structural and erosion problems. If damage to the channel is discovered, it will be repaired as appropriate.

3.2.3 Leachate Collection System (ref. 1200-1-7-.04 (8) (e))

Regulatory requirement:

> 4. *Maintain and monitor the leachate collection, removal, and treatment system (if such is present at the facility);*

No leachate system exists at this site. Rule 1200-1-7-.04 (8) (e) 4 is not applicable to this facility.

3.2.4 Gas Collection System (ref. 1200-7-.04 (8) (e))

Regulatory requirement:

> 5. *Maintain and monitor the gas collection and control system (if such is present at the facility);*

Since this facility processed only coal ash as waste, and no gas is expected to be generated from the waste, Rule 1200-1-7-.04 (8) (e) 5 is not applicable to this facility.

3.2.5 Groundwater Monitoring Plan (ref. 1200-1-7-.04 (8) (e))

Regulatory requirement:

> 6. *Maintain and monitor the ground and/or surface water monitoring system (if such is present at the facility). The monitoring system and sampling and analysis program established in the permit shall be continued during the post-closure care period, unless the permit is modified to establish a different system or program. Monitoring data must be reported in writing to the Division Director within 30 days after the completion of the analyses.*

Since this facility was never permitted as a disposal facility, groundwater monitoring has not been required. The slag has been stored and processed uncovered in this area since the 1950's. TVA has sampled all waste material to be left in-place and the material poses a low risk of groundwater contamination. The installation of the cap will significantly reduce the infiltration of water thru the waste material and will greatly reduce any potential for impacts to groundwater.

3.2.6 Inspections

Personnel from TVA will make visual inspections of the site on a regular basis for the duration of the post-closure care period. Maintenance or other corrective measures

needed to prevent the deterioration of the closure system will be identified during the inspections.

Features to be inspected include the disposal site, surface-water and security devices, and storm-water control features. Each inspection will be documented and will include, at a minimum, the following information: date and time of inspection, name of inspector, notation of observations made, nature of any remedial actions to be taken, and recommendation for corrective measures.

3.2.7 Post-Closure Certification (ref. 1200-1-7-.04 (8) (e))

Regulatory requirement:

> 7. *Following completion of the post-closure care period for each SWLF unit, the owner or operator must file with the Department a certification verifying that post-closure has been completed in accordance with the post-closure plan.*

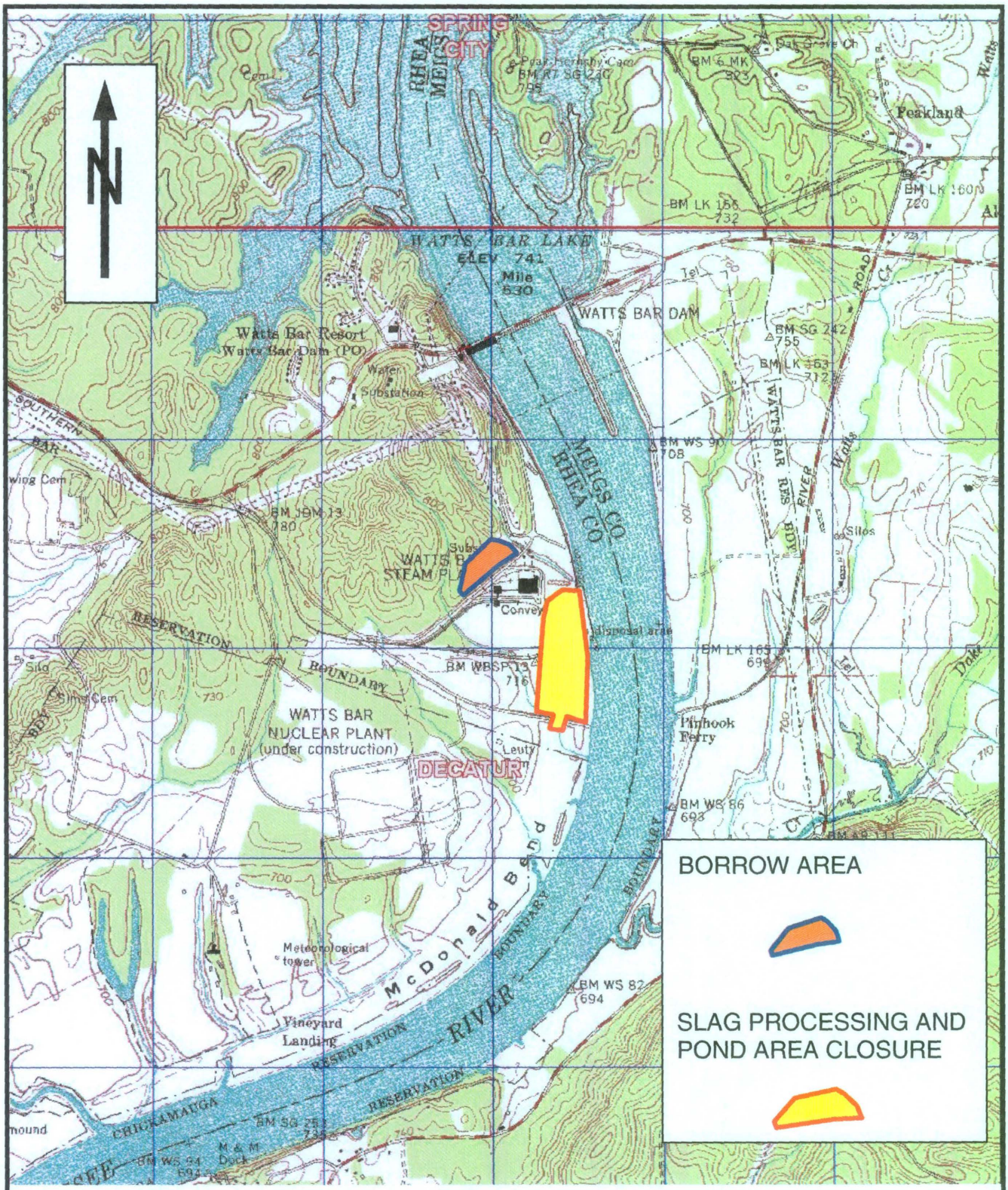
The operator will notify the Division Director in writing of its completion of the post-closure care period of the disposal facility within 60 days of completion of the post-closure care period. A professional engineer in the State of Tennessee will certify that the post-closure activities were completed in accordance with the post-closure care plan.

4.0 NOTICE IN DEED TO PROPERTY (ref. 1200-1-7-.04 (8) (f))

Regulatory requirement:

(f) Notice in Deed to Property - the operator must ensure that, within 90 days of completion of final closure of the facility and prior to sale or lease of the property on which the facility is located, there is recorded, in accordance with State law, a notation on the deed of property or on some other instrument which is normally examined during a title search that will in perpetuity notify any person conducting a title search that the land has been used as a disposal facility and its use is restricted in accordance with the approved closure/post-closure plan.

Within 90 days of completion of final closure activities of the facility and prior to final sale or lease of the property on which the facility is located, TVA will ensure that there is recorded, in accordance with State law, a notation on the deed to the property or some other instrument, which is normally examined during a title search that will in perpetuity notify any person conducting a title search that the land has been used as a disposal facility, and the use of the property is restricted in accordance with the approved closure/post-closure plan.



SOURCE: USGS TOPGRAPHIC MAPS OF DECATUR AND SPRING CITY, TENNESSEE

TVA

FIGURE 1 - LOCATION MAP SLAG PROCESSING AND POND AREA CLOSURE TVA—WATTS BAR FOSSIL PLANT

SCALE 1" = 2000 FT

APPENDIX A OF CLOSURE PLAN

APRIL 2007

TENNESSEE DEPARTMENT OF EVIRONMENT AND CONSERVATION

Division of Solid Waste Management

FOSSIL FUEL FLY ASH AND BOTTOM ASH DISPOSAL WITHIN A CLASS II FACILITY

POLICY

The purpose of this policy is to establish the criteria by which fossil fuel fly and bottom ash may be disposed of in a Class II facility:

1. The geologic buffer required will be 3 feet in total thickness with a maximum hydraulic conductivity of 1×10^{-6} cm/sec. The thickness will be measured from the base of the fill to the seasonal high water table of the uppermost unconfined aquifer, or the top of the formation aquifer;

2. No leachate migration control system will be required;

3. No gas migration control system will be required;

4. The final cover shall be 24 inches of compacted soil with a minimum of 6 inches which shall support vegetative cover; and

5. No random inspection program will be required.

Any variance to the Class II facility permit criteria will require the Commissioner's approval.

(Signature on File)
Mike Apple, Director
Division of Solid Waste Management

9-7-01
Date

policy/notebook/pn093
Revision 1: September 2001

APPENDIX B OF CLOSURE PLAN

VEGETATION SPECIFICATIONS

NATIVE GRASSESS - SEEDING AND MULCHING

(SPECIAL FOR WASTE AREAS)

SECTION 582 - Mulching

Refer to FP-96 Section 625. FP-96 Standard Specification for Construction of Roads and Bridges on Federal Highway Projects (US DOT - FHWA)

SECTION 583 - Native Grasses Seeding

583.1 – Description

This specification consists of furnishing and placing native warm season grass seed on waste disposal areas when specified by the plans or the Engineer. The use of these grasses for landfill cover crops is being encouraged by the Tennessee Department of Environment and Conservation Division of Solid Waste Management.

583.2 – Materials

1. Seeds

Seeds shall meet the requirements of applicable seed laws and shall be tested in accordance with the most current edition of the U.S. Department of Agriculture Handbook No. 30, Testing Agricultural and Vegetable Seed. Seeds shall be from the last preceding crop and comply with the requirements outlined below for purity and germination. Each variety of seed shall be furnished in separate, strong bags with each bag being fully tagged or labeled to show the variety, weight, purity, germination, and test data prescribed by law. All test

APPENDIX C OF CLOSURE PLAN

results shall be fully certified by the vendor or by a recognized seed testing agency. TVA reserves the right to require that samples be furnished, and to inspect and test the seeds after delivery. Seeds found not to comply with specification requirements shall be subject to rejection.

When mixing or forming seed mixtures, the seeds shall be carefully and uniformly mixed. Seeds shall not be mixed until each variety of seed to be used in the mix has been inspected and/or tested separately and approved.

583.2 – Materials (Continued)

Seed Varieties	Purity, Minimum %	Germination Minimum %
Sideoasts Gramma (*Bouteloua curtipendula*)	95	85
Little Bluestem (Schizachyrium scoparium)	95	85
Sand Lovegrass (*Eragrostis trichodes*)	95	85
Annual Rye (lolium multiflorum)	90	90

Seeding materials shall be free from seeds or bulbets of Wild Onion (Allium vineale), Canada Thistle (Cirsium arvense), and Johnson Grass (Sorghum halepense).

Continued next page.....

Seed species shall not contain more than six seeds per ounce of the seed of any of the following noxious weeds or the seeds of any other weed specifically listed as noxious:

Bindweed (Convolvulus arvensis)
Buckthorn (Plantago lanceolata)
Corncockle (Agrostemmo githago)
Dodder (Cuscuta species)
Oxeyedaisy (Chrysanthemum leucantheumum)
Quackgrass (Agropyron repens)
Sorrel (Rumex acetosella)

Seed species shall not contain an excess of 2 percent by weight of weed seeds, noxious or otherwise.

2. Seed or seed mixtures, rates, and seasons

Seeding mixtures, rates, and seasons shall be those specified herein. The types to be used for each area or project will be specified by the drawing or by memorandum. Mixtures or rates of application other than those specified shall be used only when specified by the plans or the Engineer. Seeding shall be planted during the season and between the dates specified. Note that the pound rates are PLS (pure live seed).

Type 1: Winter seeding ((Plant between November 1 and December 31)

(1) Sideoats Grama	4 pounds per acre
(2) Little Bluestem	5 pounds per acre
(3) Sand Lovegrass	1 pounds per acre
(4) Annual Rye	60 pounds per acre
	70 pounds per acre

Type 2: Spring seeding (Plant between April 15 and July 1).

Mixture:

(1) Sideoats Grama	4 pounds per acre
(2) Little Bluestem	5 pounds per acre
(3) Sand Lovegrass	1 pounds per acre
	10 pounds per acres

Note: All slopes 3:1 or greater shall be seeded with the winter mixture

e. Temporary Cover

Type 3: Temporary winter seeding (Plant between October 15 and March 15).

Annual Ryegrass	80 pounds per acre

583.3– Soil Chemistry Requirements

Soil pH range: 5.0 - 7.8 S.U.

Soil Fertility: Low-Medium for phosphorous and potassium.

583.4 -- Soil Preparation

Areas to be seeded shall have approved cross sections and grades. Objects such as large roots, stones, stumps, coarse vegetation, debris, or any other items that might impede mechanical mowing shall be removed and disposed of satisfactorily.

Seedbeds shall be plowed, disked, harrowed, scarified, or cultivated to the approved depth. In areas where it is practical, this work shall be done with farm-type equipment. On steep slopes, preparation of seedbeds shall be done with the tools and methods specified by the Engineer. It is strongly recommended that scarifying and preparation on cut and fill slopes be accomplished with tools or equipment specially designed for this purpose. Small furrows or grooves formed in the slopes shall be horizontal or as nearly horizontal as practical. The work shall be performed only when the ground is in a workable and tillable condition as determined by good farming practices.

583.5 -- Special Hydroseeding Equipment

Equipment to be used for the hydraulic application of planting materials shall be a Finn Hydro-Seeder, Bowie Hydro Mulcher, Toro Environmental Control Unit, or an approved equal. The equipment shall have mixing tanks with built-in agitators having operating capacities sufficient to agitate, suspend, and homogeneously mix slurries of water and planting materials. The slurry distribution lines shall be large enough to prevent clogging or stoppage. Discharge lines shall be equipped with sets of different sized hydraulic spray nozzles capable of providing for even distribution of varying slurry mixtures on areas to be seeded.

583.6 -- Seeding Methods

Seeds shall be sown with approved hydroseeding equipment. Rates specified in Section 583.2 shall be maintained in a manner that will guarantee uniform coverage. Seeding operations shall not be performed when drought, high winds, and excessive moisture or other factors may defer satisfactory results. The carrier mix shall be 0-13-13. The area shall be cultipacked immediately after seeding.

583.7 -- Maintenance

Seeded areas shall be maintained until a satisfactory cover of plant material is secured, unless stipulated otherwise. All areas shall be preserved, repaired, and protected as specified for this purpose. Areas having poor stands of plant material shall be seeded again and fertilized at the proper rates.

Watering shall be accomplished during the maintenance period to the extent necessary.

583.8 -- Method of Measurement

Seeded areas will be measured in square yard units and include the seeded areas along slopes.

Appendix D - List of Drawings

The following is a list of the drawings for this closure project. By their reference they are included as a part of this closure plan.

10W245-01 Title Sheet
10W245-02 Existing Site Conditions Surveys
10W245-03 Site Grading Plan (Slag Area)
10W245-04 Existing Transmission Line Profile
10W245-05 Cross Sections
10W245-06 Slag Disposal Details I
10W245-07 Slag Disposal Details II
10W245-08 Sediment and Erosion Control Plan (Slag Area)

APPENDIX D OF
CLOSURE PLAN

APPENDIX E

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

APPENDIX E OF
CLOSURE PLAN

1.0 INTRODUCTION

This Material Specifications and Construction Quality Assurance/Quality Control Plan (QA/QC Plan) is prepared for the proposed closure of the Watts Bar Fossil Plant Slag Processing and Pond Area. The purpose of this QA/QC Plan is to outline procedures for verifying that proper materials, construction techniques, and installation procedures are used by the Constructor, and that the design intent is met. This QA/QC plan has been developed to satisfy the requirements of rule 1200-1-7-.04(9)(c)19. In addition, this QA/QC Plan is intended to define problems that may occur during construction and to provide a mechanism for resolving these problems as they occur.

The elements of construction of the closure of this facility requiring field monitoring and documentation under this plan include: final grading of the site, and final cover system construction.

The program described by this Plan is independent of the quality control (QC) program conducted by the Constructor. This QA/QC Plan is intended to provide verification that the Constructor has met his obligation in the supply and installation of the specified materials. This plan does not replace the contract documents (design drawings and documents) regarding the selection and installation of materials.

2.0 DEFINITIONS AND USE OF TERMS

This section provides definitions for terms used in the QA/QC Plan.

Owner – Tennessee Valley Authority

Constructor – the individual or firm, responsible for construction activities. This definition applied to any party performing work defined in the construction documents. At this time TVA plans to use their own construction organization, Heavy Equipment Division (HED), for construction activities. Other TVA organizations may be used to support this portions of the work activities described herein. TVA reserves the right to subcontract construction at it's discretion.

Construction Manager – the official representative of the Owner responsible for overseeing construction of the project. If TVA uses the HED for construction the Construction Manager and Constructor are one in the same.

Conformance Testing - includes testing that is performed by the Certification Engineer to conform and qualify material prior to their use.

Certification Engineer – individual appointed by the Owner who is responsible for performing tasks outlined in this QA/QC Plan. The Certification Engineer will be

selected by TVA FES and shall be a registered Professional Engineer in the state of Tennessee.

Design Engineer – the individual(s) or firm(s) responsible for the preparation of design documents and significant design changes during construction as determined by the Certification Engineer. The design engineer shall be a registered Professional Engineer in the state of Tennessee. TVA Fossil Engineering Services (FES) is the responsible engineering organization for design and certification of this facility.

Earthwork – an activity involving the use of soil or rock materials. It also includes activities involving the use of byproducts in the construction of waste disposal facilities.

Performance Testing – includes those activities that occur during and following material installation including dike raising activities during facility operation.

Project Design Drawings and Documents – all project related drawings and documents, including design modifications and record drawings.

Project Documents – includes Constructor submittals, construction drawings, record drawings, specifications, shop drawings, field inspection reports, and project schedule.

Quality Control (QC) – functions performed by the Constructor and material supplier to verify that work performed conforms to project design drawings and documents.

Quality Assurance (QA) – provides verification that QC functions have been performed in substantial compliance with the project design drawings and documents, this function will normally be provided by a Certification Engineer chosen by TVA.

Testing Laboratory – one or more laboratories capable of conducting the required conformance and performance laboratory testing of soils and geosynthetics required by this QA/QC Plan.

3.0 CERTIFICATION ENGINEER

The Certification Engineer (or personnel under his direct supervision) will closely monitor construction of the various components of the closure plan which includes: soil placement and compaction, a protective cover soil to support native plant growth to make up the final cover system. The Certification Engineer will be a Professional Engineer licensed to practice in the state of Tennessee, who is knowledgeable in the field of soil mechanics, and will have a good working knowledge of the equipment and procedures generally used in the construction of landfills.

The Certification Engineer has the following duties:

- provide written, certified documentation attesting to conformance with the design requirements and the QA/QC Plan with respect to conditions of the construction of the final cover system;

- be present at appropriate intervals during construction of the soil components, perform appropriate tests, and obtain samples for laboratory analyses;

- observe material delivery and unloading;

- use the results of tests and laboratory analyses to document conformance with project requirements;

- provide to TVA and the Constructor the results of observations and test as the work progresses. Coordinate with Constructor when modifications to the plans are necessary to ensure compliance with the design drawings, specifications, and QA/QC Plan;

- schedule and coordinate inspection and testing activities; and

- reject defective work and verify that corrective measures have been implemented.

The Certification Engineer may utilize qualified field technicians to perform testing described and to provide as necessary additional oversight during construction.

4.0 PROJECT MEETINGS

4.1 Design Review Meeting (Optional)

Following the completion of the design of the closure plan and after review and approval by the State of Tennessee Department of Environment and Conservation (TDEC), Division of Solid Waste Management (DSWM), a design review meeting will be held. The purpose of this meeting, which the Owner, Construction Manager, and the Certification Engineer shall attend, is to accomplish the following activities:

- identify key personnel;
- provide all parties with relevant documents;
- review the project design drawings, documents, and QA/QC Plan;
- confirm responsibilities of each party;
- review reporting and documenting procedures;
- define lines of communication;
- establish work area procedures; and
- review sampling and testing procedures.

The meeting will be documented by the Certification Engineer or person designated by the Construction Manager. Copies of the minutes and relevant documents will be provided to all parties.

4.2 Pre-construction Meeting

A pre-construction meeting will be held at the site prior to the start of construction. The Owner, Construction Manager, Certification Engineer, Constructor, and others designated by the Owner will attend this meeting. In certain cases, many, if not most of these functions may be performed directly by the Owner. The purpose of the meeting is to accomplish the following activities:

- review the construction drawings and documents, QA/QC Plan, work area procedures, construction procedures, and other related issues;
- define lines of communication and authority;

- review the project schedule;
- review best management practices for erosion and sediment control and construction stormwater management during each phase of construction;
- review testing procedures and procedures for correcting and documenting; construction deficiencies, repairs, and retesting;
- review testing and record drawing documentation procedures; and
- conduct a site inspection to discuss work areas, work plans, stockpiling, equipment and material laydown areas, access roads, and related items.

This meeting will be documented by the Construction Manager or authorized representative, and copies of the documentation will be distributed to all parties.

4.3 Progress Meetings

A progress meeting may be held daily just prior to commencement or just following the completion of work. This meeting should be attended by the Construction Manager, and the Constructor's on-site superintendent and the Certification Engineer. The following activities should be discussed during this meeting:

- review the previous days activities and accomplishments;
- review work locations and scheduled work;
- discuss problems; and
- review test data.

This meeting should be documented by the Certification Engineer, and copies of the documentation will be distributed to the Owner, Construction Manager, and Constructor.

4.4 Deficiency Meetings

As required, meetings will be held to discuss problems or deficiencies. At a minimum, these meetings will be attended by the Construction Manager, Certification Engineer, and the Constructor's on-site superintendent. If the problem requires a design

modification, the Design Engineer and Constructor's project manager should also be present. The meeting will be documented by the Certification Engineer.

5.0 Potential Problems And Deficiencies

During construction, the frequency of testing may be increased at the discretion of Certification Engineer or the Construction Manager when visual observations of construction performance indicate a potential problem. Additional testing for suspected areas will be considered when:

- excessive pumping or cracking of material occurs;
- under adverse weather conditions;
- work is conducted in difficult areas; and
- high frequency of failing tests is observed.

If a defect is discovered in the earthwork product, the Certification Engineer shall immediately determine the extent and nature of the defect. If the defect is indicated by an unsatisfactory test result, the Certification Engineer shall determine the extent of the deficient area by additional tests, observations, a review of records, or other appropriate means and notify the Constructor and Construction Manager.

The Certification Engineer shall schedule appropriate retests after the work deficiency has been corrected. Retests recommended by the Certification Engineer must verify that the defect has been corrected before any additional work is performed in the area of the deficiency

6.0 FINAL COVER SYSTEM SOIL COMPONENT CONSTRUCTION

6.1 Introduction

This section addresses material specifications and CQA activities associated with the construction of the soil components for the final cover system. Details of the soil components of the final cover system are provided in the Design Drawings. These components include:

- compacted soil layer; and
- vegetative soil layer

The soil components of the final cover system shall meet requirements related to material specification and construction quality provided in this QA/QC Plan. Field tests shall be performed during construction to evaluate if the characteristics of soil from proposed sources meet the material acceptance requirements.

6.2 Compacted Soil Layer

Soils for the compacted soil layer shall consist of relatively homogenous, silty, and clayey soils which are substantially free of debris, rock, plant materials, frozen materials, foreign objects, and organics

A borrow area for the compacted soil layer has been identified. Testing of the material in that borrow area has been completed. Selected tables from the soil report of that area are reproduced in Appendix H. Based on the results of these laboratory tests, material to meet the requirements of the compacted soil layer material have been identified. The range of moisture/density values which results in the required permeability has been determined based on the laboratory testing data. This range will then be used as the acceptable range of moisture/density values for field compaction control.

The compacted soil layer material shall be placed in 8 to 10 in. loose (6 to 8 in. compacted) lifts. The lift depth shall be verified by a manual method (i.e., hand auguring). Soil clods shall be broken down, and moisture conditioning shall be conducted to preserve the homogeneity of the soil and to obtain relatively uniform moisture content through the layer. The moisture content and in-place density of the compacted soil layer will be field tested during processing and placement when requested by the Constructor for verification purposes. The action of heavy equipment shall be observed for penetration, pumping, and cracking of the compacted soil layer surface.

The finished surface shall be firm, uniform, and relatively smooth. Perforations in the compacted soil layer created by nuclear density probes, stakes, or any other methods shall be filled with compacted soil.

Soil thickness verification will be performed by manual methods (i.e., hand auguring and/or thickness markers) due to possible settlement of the underlying layers during final cover construction activities.

6.3 Vegetative Soil Layer

The soil to be utilized for establishing the vegetative cover shall be capable of sustaining a healthy stand of vegetation, and shall consist of soil reasonably free from subsoil, noxious weeds, stones larger than two inches in diameter, or other deleterious matter that would prevent the formation of a suitable seed bed.

Low ground-pressure equipment shall be used to place the material for the vegetative soil layer over the compacted soil layer. The equipment shall be operated over the full depth of the layer. Care should be exercised when material is being placed around pipes and other appurtenances to prevent damage to these components. The material shall be placed by pushing the material upslope only. Vegetative soil layer material should not be placed from the top of the slope. The finished surface of the vegetative soil layer shall be roughened to help prevent erosion from occurring, seeded as described in the Vegetation Specification included in Appendix C of the closure plan.

Soil thickness verification will be performed by manual methods (i.e., hand auguring and/or thickness markers) due to possible settlement of the underlying layers during final cover construction activities.

6.4 Test Methods and Sampling Requirements

The following Table presents the field test methods which shall be used to evaluate construction quality for the soil components of the final cover system. The tests shall be conducted in accordance with the current versions of the corresponding standard methods given.

COMPONENT	REQUIRED TEST	MINIMUM FREQUENCY	ACCEPTANCE CRITERIA
Compacted Soil Layer	Visual	As Required	Substantially free of debris, large rocks, plant material, or other deleterious substances
Compacted Soil Layer	Nuclear Density In place Density & Moisture	1 per 5000 CY placed or 1 each day soil is placed	*Plots of the dry density and moisture content shall be in the acceptable zones of hydraulic conductivity as provided in figures 5 and 6 in Appendix H

COMPONENT	REQUIRED TEST	MINIMUM FREQUENCY	ACCEPTANCE CRITERIA
Compacted Soil Layer	Moisture Content	1 per 10 Nuclear Densometer tests	Check nuclear Densometer measurements to verify moisture correction
Compacted Soil Layer	Hand Auger - Check completed lift thickness	30 locations evenly distributed across the project area (1 ea representing approx 1 Acre)	12" minimum depth
Compacted Soil Layer	Std Proctor	1 every 15,000 CY of material placed	Verify borrow source consistency with initial soil report (Table C-2 in App. H) and adjust as needed
Vegetative Layer	Visual	As Required	Substantially free of debris, large rocks, or other deleterious substances
Vegetative Layer	Hand Auger - Check completed lift thickness	30 locations evenly distributed across the project area (1 ea representing approx 1 Acre)	12" minimum depth

* In order to implement the use of the graphical plots in the field, the soil technicians must first classify the soil types. Classification based on visual observations may not be conclusive, therefore one-point standard Proctor compaction tests will be occasionally performed in the field to aid in identification of questionable materials. After the materials have been placed and compacted in lifts, the technicians then measure the dry density and moisture content in the field. The field dry density-moisture content point is then plotted on the appropriate graphical plot (Figure 5 or 6 - Acceptable Zone of Hydraulic Conductivity - in Appendix H). If the field measured dry density and

moisture content values fall within the acceptable zone, then no further action is needed. If the field measured values fall outside the acceptable zone, then additional compaction and/or moisture conditioning is required to ensure the compacted fill is brought within the acceptable zone.

7.0 Potential Problems And Deficiencies

During construction, the frequency of testing may be increased at the discretion of the Certification Engineer or the Construction Manager when visual observations of construction performance indicate a potential problem. Additional testing for suspected areas will be considered when:

- excessive pumping or cracking of material occurs;
- under adverse weather conditions;
- work is conducted in difficult areas; and
- high frequency of failing tests is observed.

If a defect is discovered in the earthwork product, the Certification Engineer shall immediately determine the extent and nature of the defect. If the defect is indicated by an unsatisfactory test result, the Certification Engineer shall determine the extent of the deficient area by additional tests, observations, a review of records, or other appropriate means. All deficiencies shall be corrected by the Constructor.

The Certification Engineer shall schedule appropriate retests after the work deficiency has been corrected. Retests recommended by the Certification Engineer must verify that the defect has been corrected before any additional work is performed by the Constructor in the area of the deficiency.

8.0 REPORTING AND DOCUMENTATION

8.1 Deficiencies

When deficiencies are discovered, the Certification Engineer shall immediately determine the nature and extent of the problem, notify the Constructor, and complete required documentation. In all cases, the Certification Engineer will notify the Constructor within one-half hour of discovering the deficiency. If the deficiency will cause construction delays of more than four hours or will necessitate substantial rework, the Certification Engineer shall also notify the Construction Manager.

The Constructor shall correct the deficiency to the satisfaction of the Certification Engineer. If the Constructor is unable to correct the problem, the Certification Engineer will prepare a nonconformance report and will develop and present suggested solutions to the Construction Manager for approval.

The corrected deficiency shall be re-tested before additional work is performed. All retests, and the steps taken to correct the problem, will be documented by the Certification Engineer.

8.2 Documentation

The QA/QC Plan depends on through monitoring and documentation of construction activities. Therefore, the Certification Engineer shall document that Quality Assurance requirements have been addressed and satisfied. Documentation shall consist of daily record keeping, construction problem resolutions, photographic records, design revisions, weekly progress reports, and a certification and summary report.

8.2.1 Daily Record Keeping

At a minimum, daily records shall consist of field notes, summaries of the daily meetings with the Constructor, observations and data sheets, and construction problems and resolution reports. This information shall be submitted to the Construction Manager for review and approval.

A Daily Meeting Report will be prepared each day, summarizing discussions held with a Constructor. This report will include the following items:

a. date, project name, and location;

b. names of parties involved in discussions;

c. data on weather conditions;

d. listing and location of construction activities underway during the time frame of the Daily Summary Report;

e. equipment present on-site;

f. descriptions of areas and/or activities being inspected and/or tested, and related documentation;

g. description of off-site materials received;

h. scheduled activities;

i. items discussed;

j. signature of the Certification Engineer.

8.2.2 Observation and Test Sheets

Observation and test data sheets shall include the following information:

a. date, project name, and location;

b. weather data;

c. reduced-scale site plan showing work areas, including sample and test locations;

d. description of ongoing construction;

e. summary of test results identified as passing, failing, or in the event of a failed test, retest;

f. calibration of test equipment;

g. summary of decisions regarding acceptance of the work and/or corrective actions taken;

h. signature of the Certification Engineer.

8.2.3 Construction Problem Reports

This report identifies and documents construction problems and resolutions. It is intended to document problems involving significant rework and is not intended to document items easily corrected unless the problems are recurring. At a minimum, this report shall include the following items:

a. detailed description of the problem;

b. location and cause of the problem;

c. how the problem was identified;

d. resolution of the problem;

e. personnel involved;

f. signature of the Certification Engineer and Construction Manager.

8.2.4 Certified Construction

- The Certification Engineer will certify that the components meet the requirements in the Design Drawings and will submit approval to the Construction Manager.

8.2.5 Design Changes

Design changes may be required during construction. In such cases, the Certification Engineer shall notify the Construction Manager, who will then notify the responsible State Agencies. Design changes shall only be made with written agreement of the Construction Manager.

9.2.6 Weekly Progress Reports

The Certification Engineer will prepare weekly progress reports summarizing construction and quality control activities. At a minimum this report, submitted to the Construction Manager, shall contain the following information:

a. date, project name, and location;

b. summary of work activities;

c. summary of deficiencies and/or defects and resolutions;

d. signature of Certification Engineer.

8.2.7 Certification Reports

The Certification Engineer will be required to submit the following certification report. A certification report will also be required for final cover system construction.

This report will cover the capping phase of construction and will be required after closure of the facility. This report will address the final compacted soil layer, and vegetative layer.

At completion of construction, the Certification Engineer shall submit a certification report to the Construction Manager. This report shall certify that the work has been performed in substantial compliance with the approved Design Plans. At a minimum, this report shall contain the following information:

a. summary of all construction activities;

b. test results;

c. observation and test data sheets;

d. sampling and testing location plan;

e. description of significant construction problems and their resolution;

f. list of changes from the approved plans and the justification for these changes;

g. a certification statement signed and sealed by the Certification Engineer.

HYDRAULIC CALCULATIONS

The hydraulic Calculations are attached. These calculations utilize the TR-55 methodology as computed by the storm water modeling software HYDROCAD. Calculations are based on a 25 year 24 hour storm event. A 100 year 24 hour storm event was used for the emergency spillway for the new detention pond located at the North end of the closure site.

There are four HYDROCAD calculations attached. This was necessary due to the large watershed that discharges through the existing NPDES outfall 002. This is the same outfall that storm water runoff from the slag cap will discharge to. Also, a small portion of the Slag Processing Area Cap will drain to a new detention pond at the north end. This pond will discharge to a new NPDES outfall. This area required a separate model. The sequence of each calculation is provided below:

1. Drainage for Remaining 002 Watershed (102 Acres) - This discharge links to the Slag Process Cap Model. 24 year 24 hour storm event

2. Drainage for the Slag Processing Area Cap (Except for the far northern portion). This includes verification that the existing fly ash pond and spillway structures will handle the flow. 24 year 24 hour storm event

3. Drainage for the upper north end of the Slag Processing Area Cap and the new Detention Pond. 24 year 24 hour storm event

4. Drainage for the upper north end of the Slag Processing Area Cap and the new Stromwater Pond. Calculation summary is for Emergency Spillway Only. 100 year 24 hour storm event

Calculations have an area map that shows locations of sub-catchments (drainage areas), reaches (distinct drainage flow paths such as ditches, culverts, etc.), ponds, and links (discharges from other programs or processes). This is then followed by a Node Diagram showing how sub-catchments, reaches, ponds, and links are tied. Following this is a summary of the total acres associated with Runoff Curve Numbers (CN). Next is a summary for each item in the model. This summary provides data associated with Storm Peak Discharge and includes: areas, runoff depth, flow lengths, time of concentration (Tc), CN, Inflow rate, Outflow rate, average depth, velocities, etc.. This is arranged with sub-catchments first, followed by reaches, ponds, and links. After the summary pages are detailed sheets for each item that includes the hydrograph.

The detention pond in effect will serve as a sediment trap until final seeding and vegetative cover becomes established. This pond has been sized to exceed the minimum requirements for a sediment trap as specified in the Tennessee Erosion and Sediment Control Handbook.

These calculations verify that the completed ditches, culverts and ponds are designed to properly control runoff from a 25 year 24 hour storm event. These calculations show that the emergency spillway for the new stormwater pond will properly discharge runoff from a 100 year 24 hour storm event. Also, these calculations show that the existing spillway structures for NPDES outfall 002 can discharge the runoff from a 25 year 24 hour storm event.

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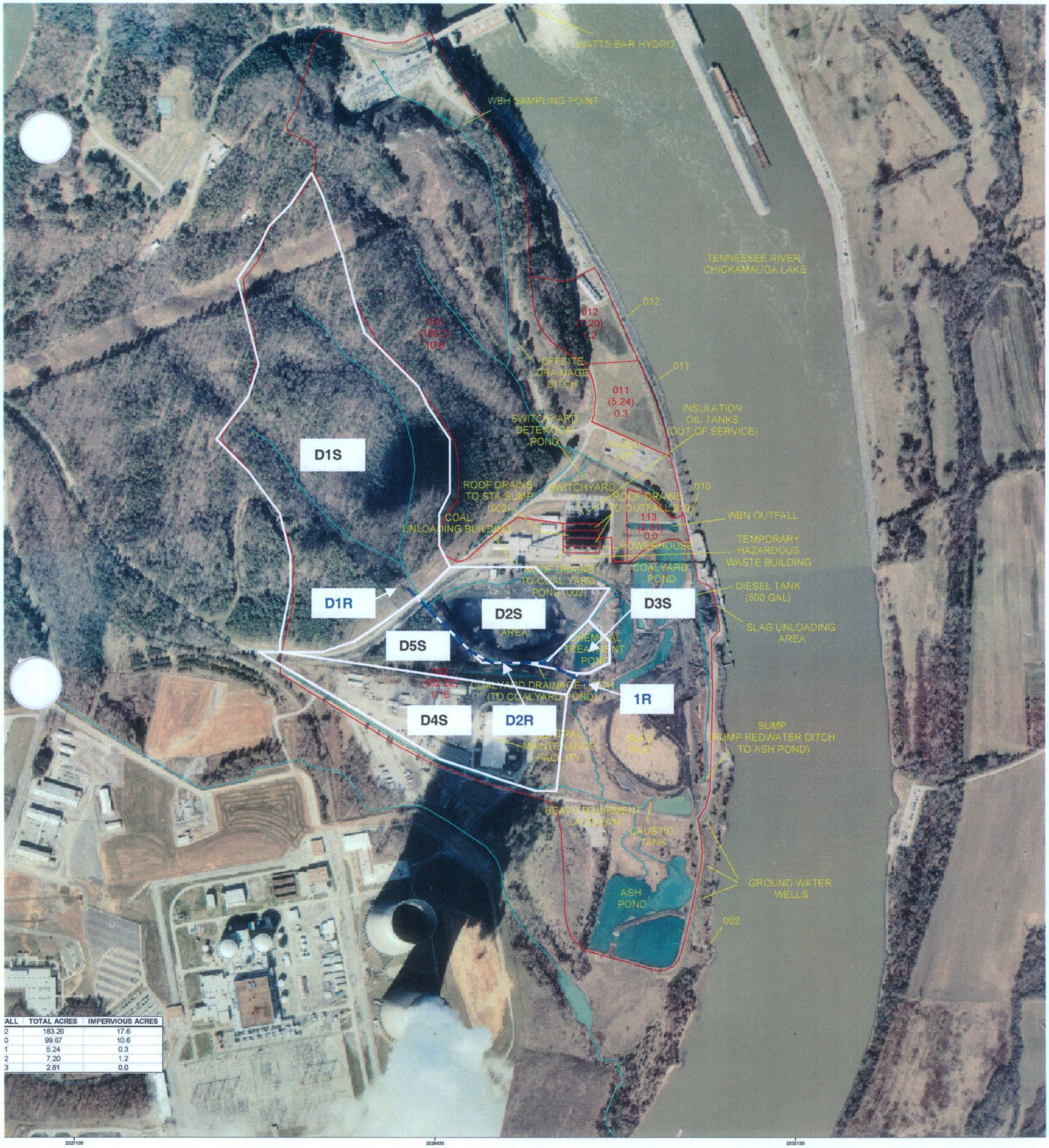
CLOSURE PLAN



ALL	TOTAL ACRES	IMPERVIOUS ACRES
2	183.26	17.6
0	99.67	10.6
1	5.24	0.3
2	7.20	1.2
3	2.81	0.0

Watts Bar Fossil Plant

nuary 31, 1998
creage Noted With Parentheses
vious Acreage Noted Without Parentheses.
Projection: Tennessee Stateplane
Fipszone: 4100
Units: Feet Datum: NAD83

1:4500
0 240 480 960 1,440 1,920 Feet

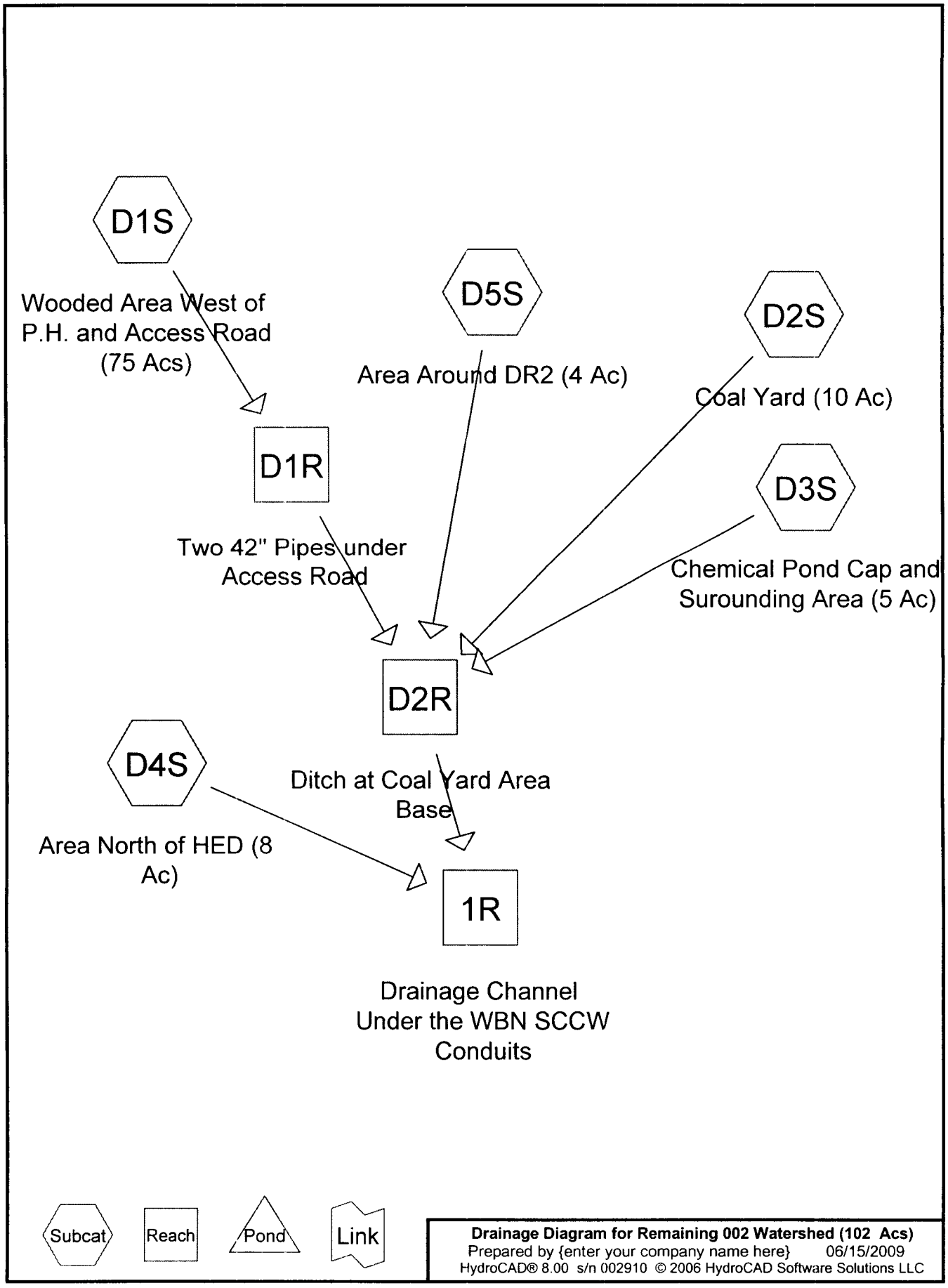
Legend

- Sample Sites
- Drainway/Water
- Drainage Boundaries
- Pond

Revision By:	Date:	Revision Number:
RJHALE 6409	4/5/2002	REV-1
RJHALE 6409	4/19/2002	REV-2
albowen 751-2087	5/6/2003	REV-3

Produced by TVA RSOE&ERTA's Geographic Information and Engineering

n of Sub-catchments and Reaches for Hydro-
del – Remaining Watershed


D1S
Wooded Area West of P.H. and Access Road (75 Acs)
D5S
Area Around DR2 (4 Ac)
D2S
Coal Yard (10 Ac)
D1R
Two 42" Pipes under Access Road
D3S
Chemical Pond Cap and Surounding Area (5 Ac)
D2R
D4S
Area North of HED (8 Ac)
Ditch at Coal Yard Area Base
1R
Drainage Channel Under the WBN SCCW Conduits
Subcat
Reach
Pond
Link
Drainage Diagram for Remaining 002 Watershed (102 Acs)
Prepared by {enter your company name here} 06/15/2009
HydroCAD® 8.00 s/n 002910 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
10.000	50	Coal Material (D2S)
4.200	65	Brush, Good, HSG C (D3S)
83.000	70	Woods, Good, HSG C (D1S,D4S)
4.000	73	Woods, Fair, HSG C (D5S)
0.800	74	>75% Grass cover, Good, HSG C (D3S)
102.000		

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment D1S: Wooded Area West of P.H. and Access R Runoff Area=75.000 ac Runoff Depth>2.52"
Flow Length=3,000' Tc=106.1 min CN=70 Runoff=66.66 cfs 15.775 af

Subcatchment D2S: Coal Yard (10 Ac) Runoff Area=10.000 ac Runoff Depth>1.01"
Flow Length=650' Slope=0.0050 '/' Tc=24.5 min CN=50 Runoff=7.61 cfs 0.843 af

Subcatchment D3S: Chemical Pond Cap and Surounding Area Runoff Area=5.000 ac Runoff Depth>2.23"
Flow Length=600' Tc=37.3 min CN=66 Runoff=8.13 cfs 0.929 af

Subcatchment D4S: Area North of HED (8 Ac) Runoff Area=8.000 ac Runoff Depth>2.55"
Flow Length=2,005' Slope=0.0130 '/' Tc=75.3 min CN=70 Runoff=9.18 cfs 1.700 af

Subcatchment D5S: Area Around DR2 (4 Ac) Runoff Area=4.000 ac Runoff Depth>2.82"
Flow Length=700' Slope=0.0110 '/' Tc=75.5 min CN=73 Runoff=5.14 cfs 0.940 af

Reach 1R: Drainage Channel Under the W Avg. Depth=2.64' Max Vel=3.04 fps Inflow=80.34 cfs 20.092 af
n=0.040 L=31.0' S=0.0032 '/' Capacity=194.33 cfs Outflow=80.34 cfs 20.088 af

Reach D1R: Two 42" Pipes under Access Avg. Depth=1.09' Max Vel=13.05 fps Inflow=66.66 cfs 15.775 af
D=42.0" n=0.011 L=112.5' S=0.0178 '/' Capacity=317.07 cfs Outflow=66.64 cfs 15.773 af

Reach D2R: Ditch at Coal Yard Area Base Avg. Depth=1.94' Max Vel=4.78 fps Inflow=73.67 cfs 18.485 af
n=0.040 L=1,160.0' S=0.0112 '/' Capacity=1,594.27 cfs Outflow=73.49 cfs 18.393 af

Total Runoff Area = 102.000 ac Runoff Volume = 20.187 af Average Runoff Depth = 2.37"
100.00% Pervious Area = 102.000 ac 0.00% Impervious Area = 0.000 ac

Subcatchment D1S: Wooded Area West of P.H. and Access Road (75 Acs)

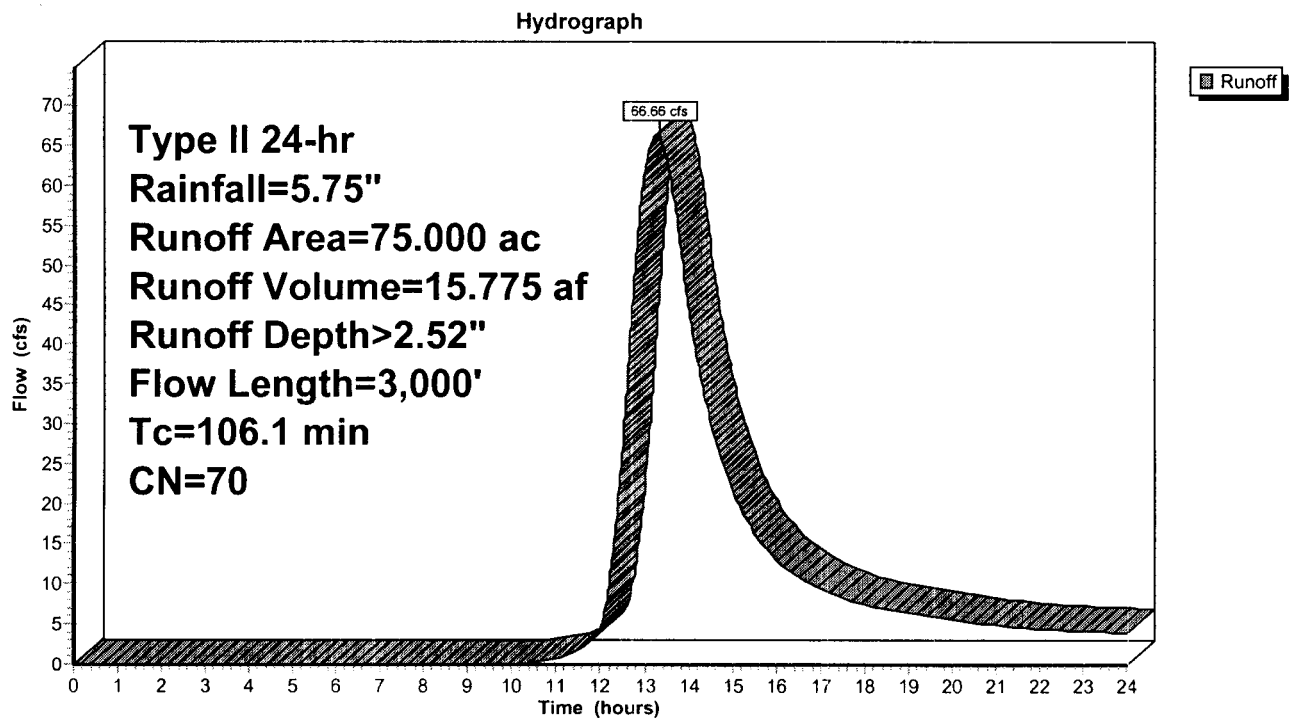
Runoff = 66.66 cfs @ 13.32 hrs, Volume= 15.775 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
75.000	70	Woods, Good, HSG C
75.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	300	0.0700	0.17		**Sheet Flow, Upper Portion** Woods: Light underbrush n= 0.400 P2= 3.50"
76.1	2,700	0.0140	0.59		**Shallow Concentrated Flow, Rest of Watershed** Woodland Kv= 5.0 fps
106.1	3,000	Total			

Subcatchment D1S: Wooded Area West of P.H. and Access Road (75 Acs)



Subcatchment D2S: Coal Yard (10 Ac)

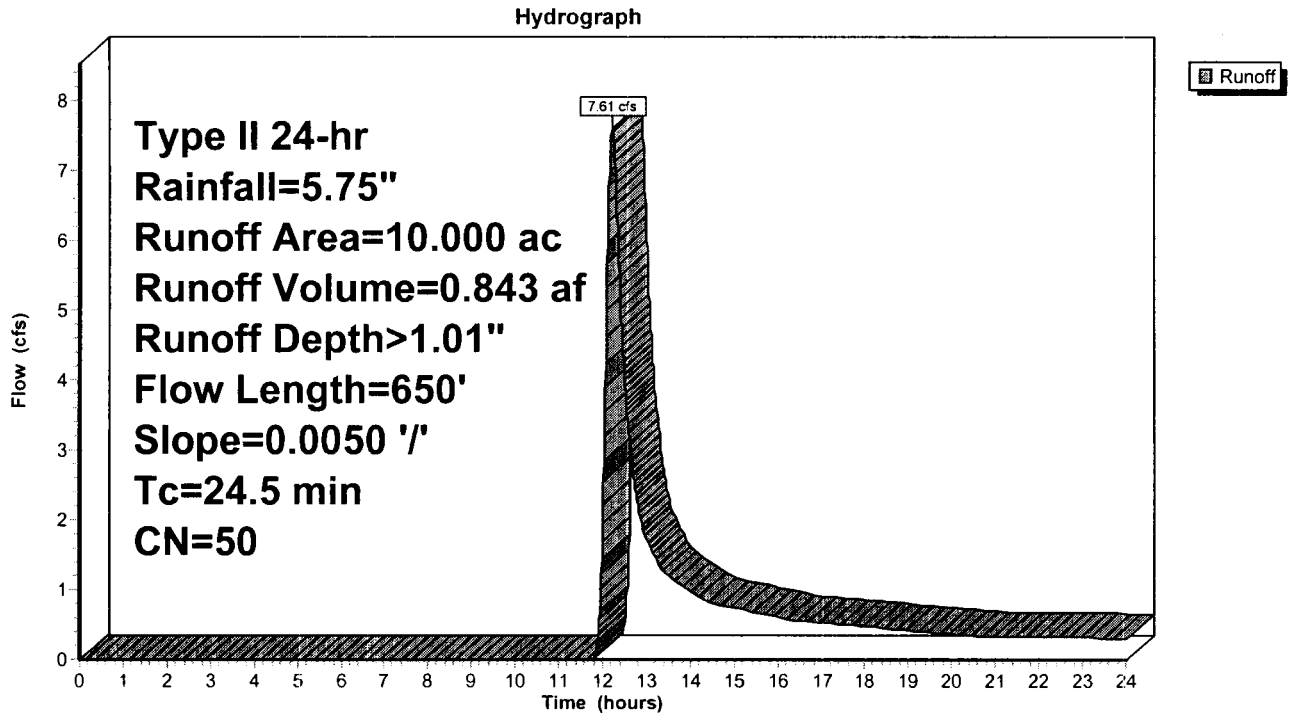
Runoff = 7.61 cfs @ 12.22 hrs, Volume= 0.843 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
10.000	50	Coal Material
10.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	300	0.0050	0.31		**Sheet Flow, Upper Portion** Fallow n= 0.050 P2= 3.50"
8.2	350	0.0050	0.71		**Shallow Concentrated Flow, Lower Portion** Nearly Bare & Untilled Kv= 10.0 fps
24.5	650	Total			

Subcatchment D2S: Coal Yard (10 Ac)



Subcatchment D3S: Chemical Pond Cap and Surounding Area (5 Ac)

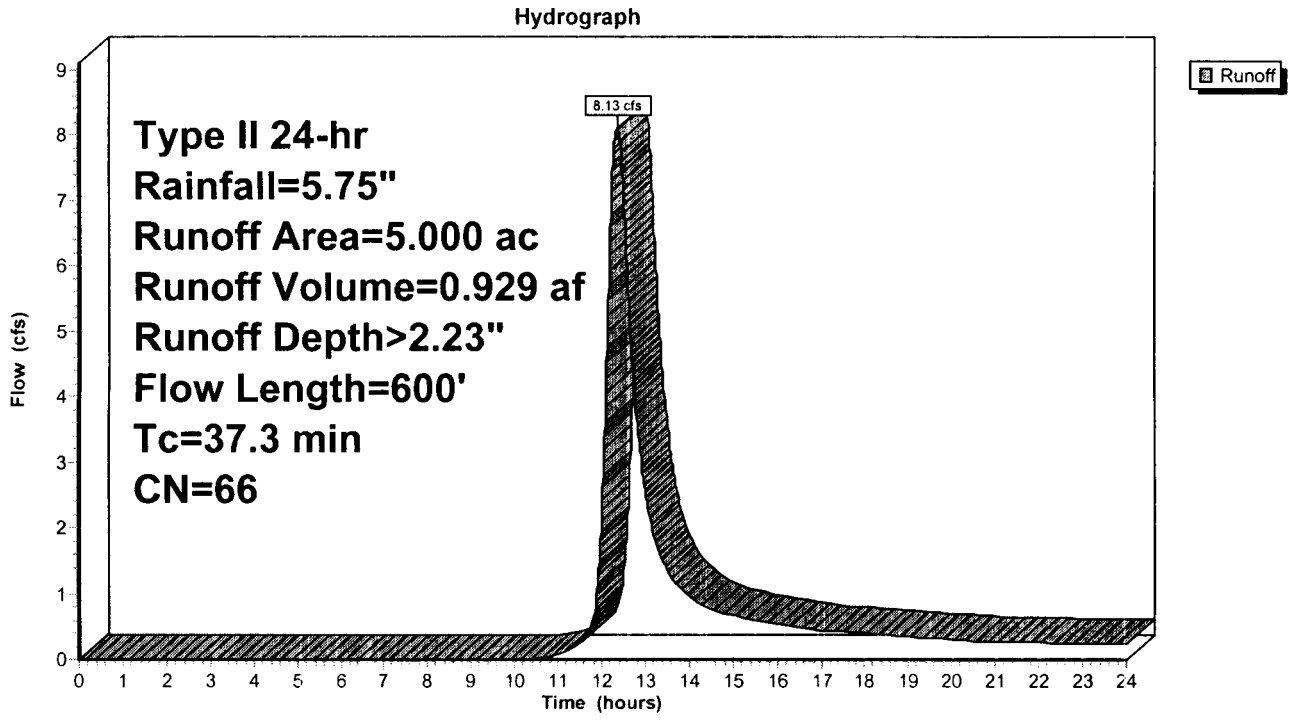
Runoff = 8.13 cfs @ 12.35 hrs, Volume= 0.929 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
4.200	65	Brush, Good, HSG C
5.000	66	Weighted Average
5.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.3	300	0.0070	0.15		**Sheet Flow, Upper Portion** Grass: Short n= 0.150 P2= 3.50"
3.0	300	0.0570	1.67		**Shallow Concentrated Flow, Lower Portion** Short Grass Pasture Kv= 7.0 fps
37.3	600	Total			

Subcatchment D3S: Chemical Pond Cap and Surounding Area (5 Ac)



Subcatchment D4S: Area North of HED (8 Ac)

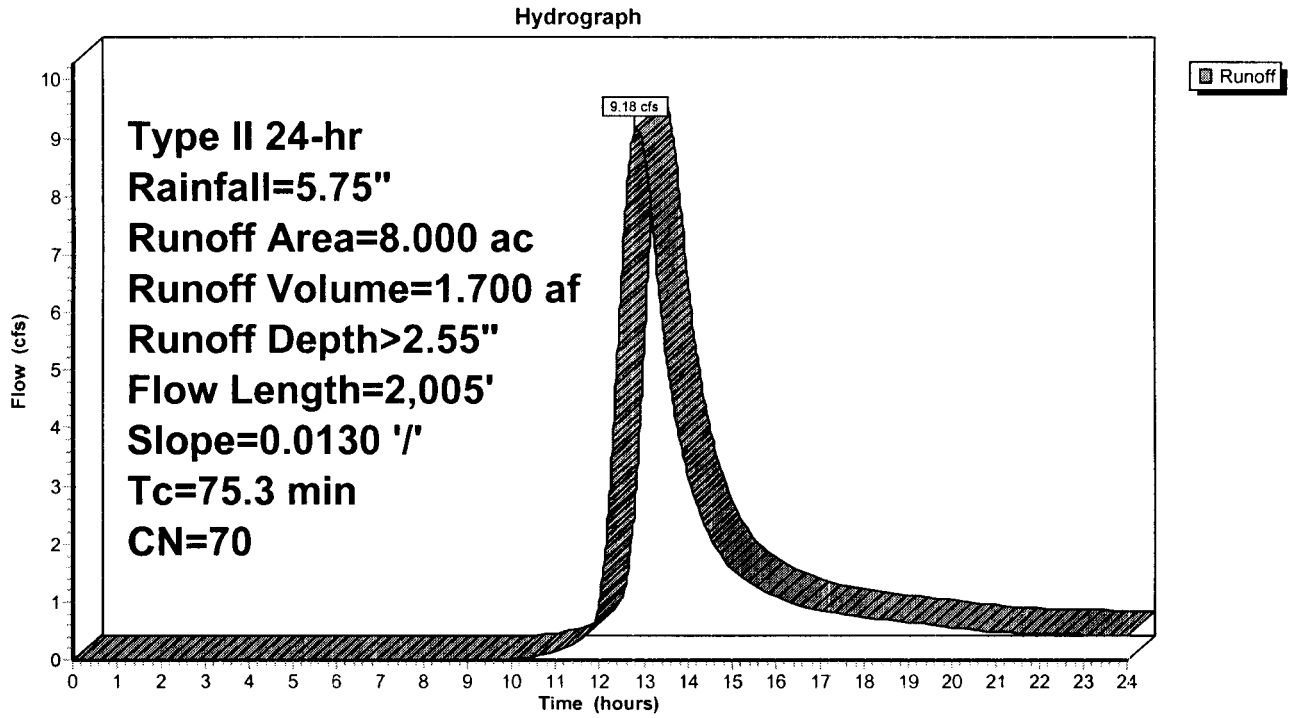
Runoff = 9.18 cfs @ 12.81 hrs, Volume= 1.700 af, Depth> 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
8.000	70	Woods, Good, HSG C
8.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.7	300	0.0130	0.09		**Sheet Flow, Upper portion** Woods: Light underbrush n= 0.400 P2= 3.50"
16.6	1,705	0.0130	1.71		**Shallow Concentrated Flow, Lower Portion** Grassed Waterway Kv= 15.0 fps
75.3	2,005	Total			

Subcatchment D4S: Area North of HED (8 Ac)



Subcatchment D5S: Area Around DR2 (4 Ac)

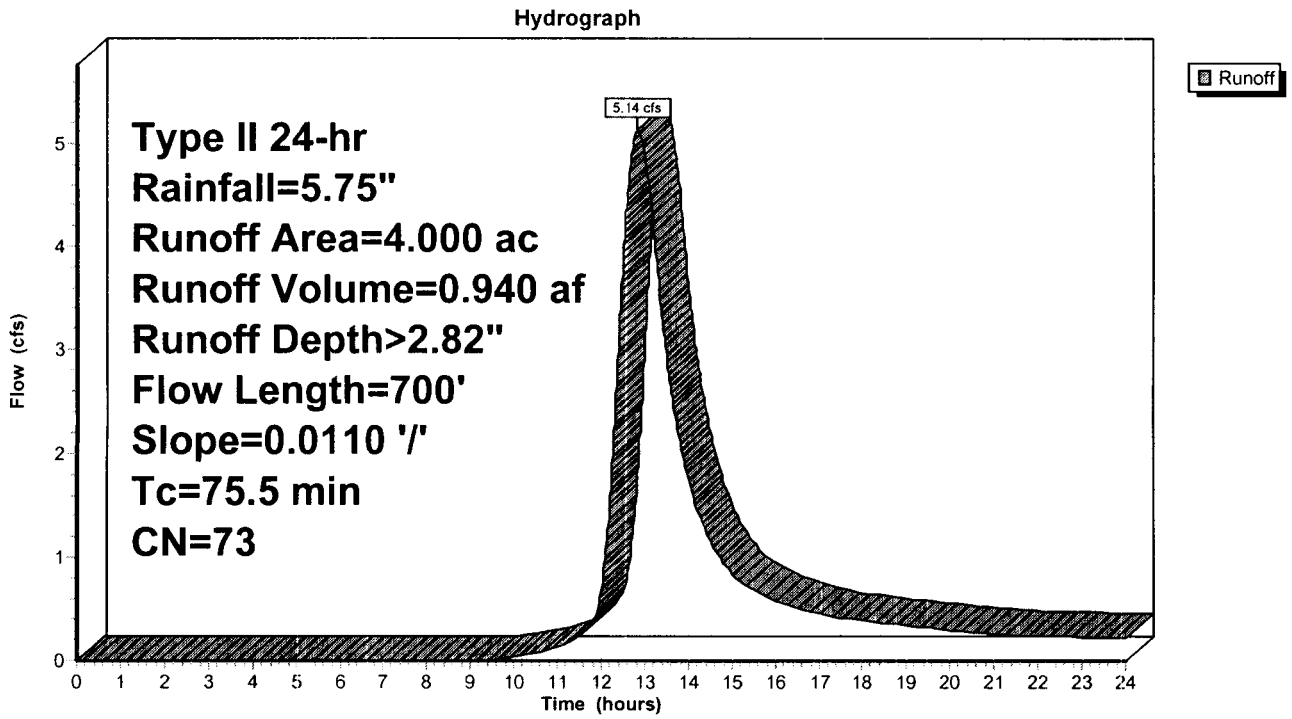
Runoff = 5.14 cfs @ 12.84 hrs, Volume= 0.940 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
4.000	73	Woods, Fair, HSG C
4.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
62.8	300	0.0110	0.08		**Sheet Flow, upper portion** Woods: Light underbrush n= 0.400 P2= 3.50"
12.7	400	0.0110	0.52		**Shallow Concentrated Flow, Lower Portion** Woodland Kv= 5.0 fps
75.5	700	Total			

Subcatchment D5S: Area Around DR2 (4 Ac)



Reach 1R: Drainage Channel Under the WBN SCCW Conduits

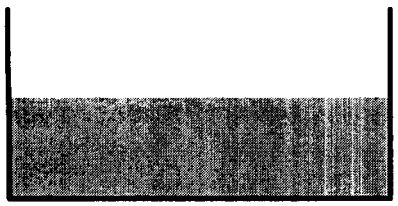
[61] Hint: Submerged 21% of Reach D2R bottom

Inflow Area = 102.000 ac, Inflow Depth > 2.36"
Inflow = 80.34 cfs @ 13.25 hrs, Volume= 20.092 af
Outflow = 80.34 cfs @ 13.26 hrs, Volume= 20.088 af, Atten= 0%, Lag= 0.3 min

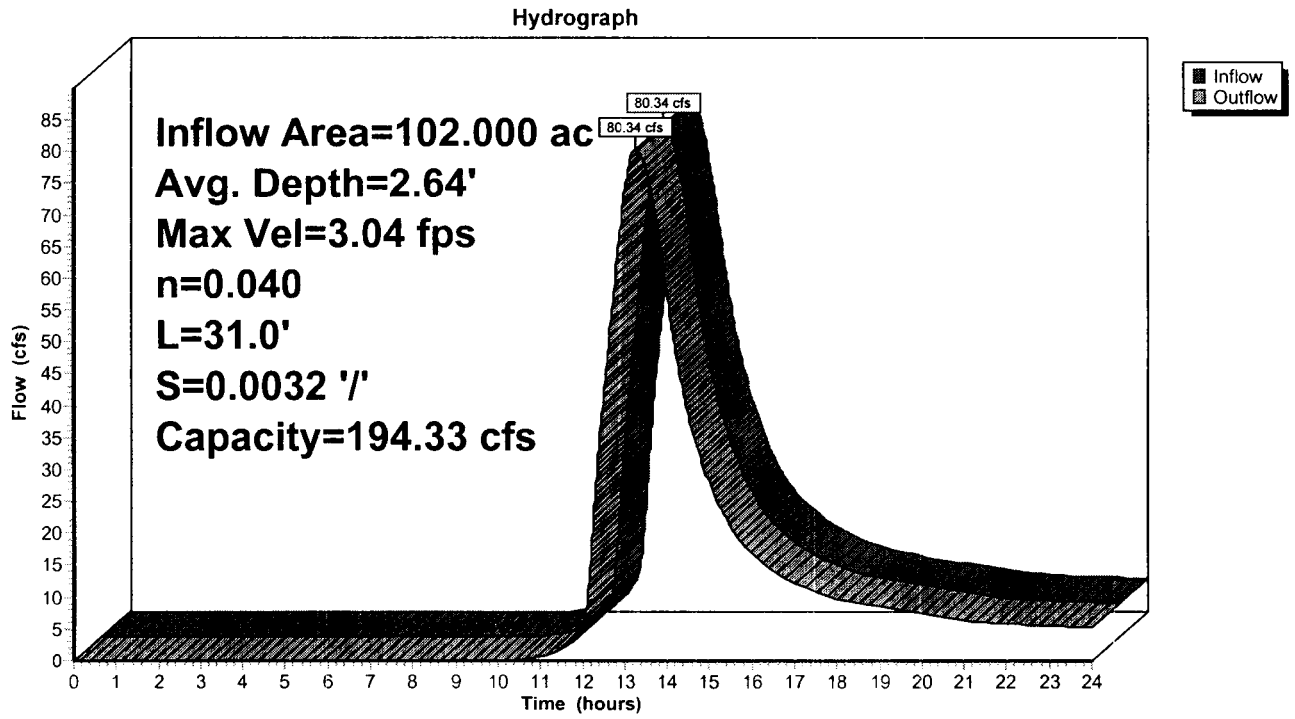
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.04 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 0.4 min

Peak Storage= 819 cf @ 13.26 hrs, Average Depth at Peak Storage= 2.64'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 194.33 cfs

10.00' x 5.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Length= 31.0' Slope= 0.0032 '/'
Inlet Invert= 707.10', Outlet Invert= 707.00'



Reach 1R: Drainage Channel Under the WBN SCCW Conduits



Reach D1R: Two 42" Pipes under Access Road

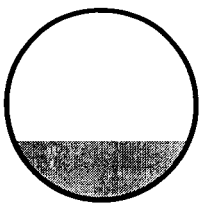
[52] Hint: Inlet conditions not evaluated

Inflow Area = 75.000 ac, Inflow Depth > 2.52"
Inflow = 66.66 cfs @ 13.32 hrs, Volume= 15.775 af
Outflow = 66.64 cfs @ 13.32 hrs, Volume= 15.773 af, Atten= 0%, Lag= 0.1 min

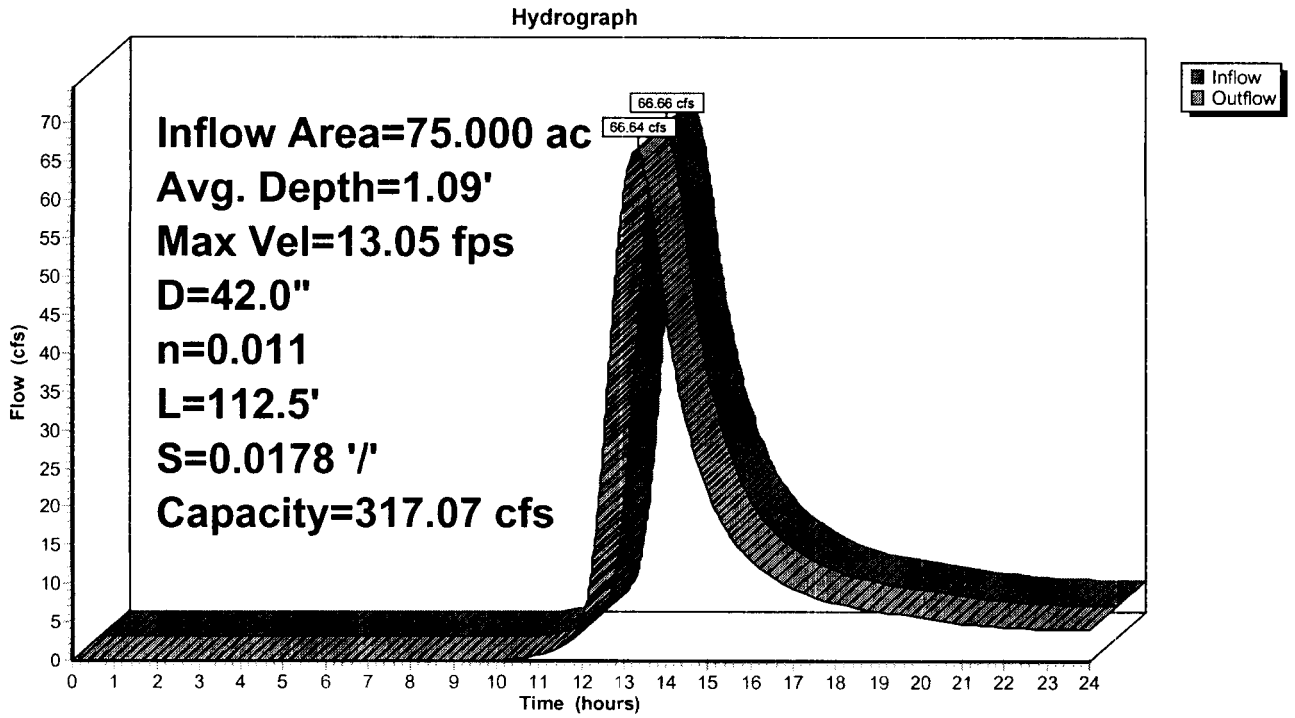
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 13.05 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.89 fps, Avg. Travel Time= 0.3 min

Peak Storage= 575 cf @ 13.32 hrs, Average Depth at Peak Storage= 1.09'
Bank-Full Depth= 3.50', Capacity at Bank-Full= 317.07 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
42.0" Diameter Pipe, n= 0.011 Concrete pipe, straight & clean
Length= 112.5' Slope= 0.0178 '/'
Inlet Invert= 722.60', Outlet Invert= 720.60'



Reach D1R: Two 42" Pipes under Access Road



Reach D2R: Ditch at Coal Yard Area Base

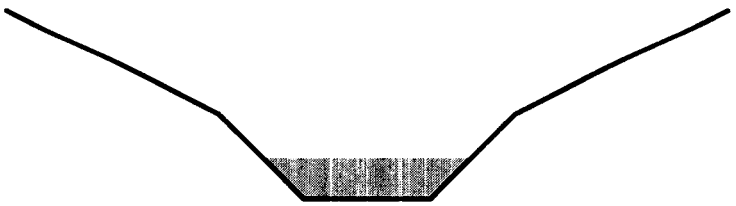
[61] Hint: Submerged 67% of Reach D1R bottom

Inflow Area = 94.000 ac, Inflow Depth > 2.36"
Inflow = 73.67 cfs @ 13.21 hrs, Volume= 18.485 af
Outflow = 73.49 cfs @ 13.32 hrs, Volume= 18.393 af, Atten= 0%, Lag= 6.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.78 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 2.41 fps, Avg. Travel Time= 8.0 min

Peak Storage= 17,835 cf @ 13.25 hrs, Average Depth at Peak Storage= 1.94'
Bank-Full Depth= 9.00', Capacity at Bank-Full= 1,594.27 cfs

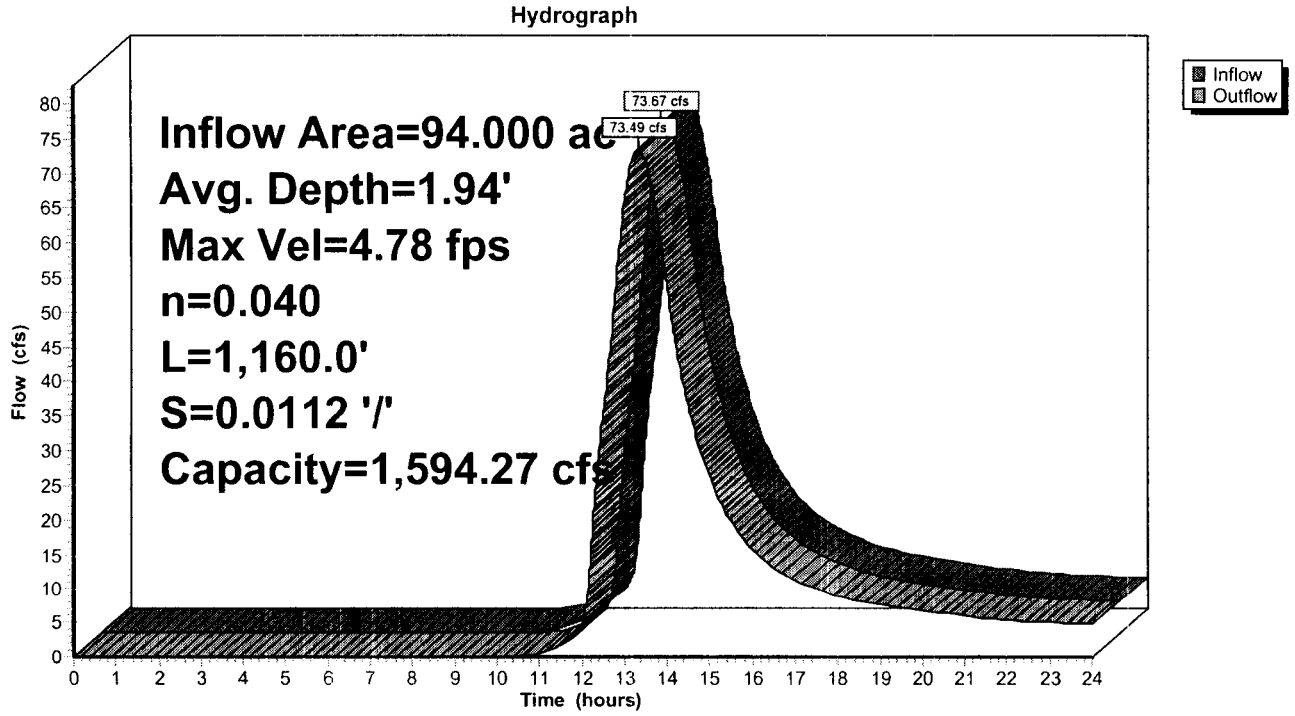
Custom cross-section, Length= 1,160.0' Slope= 0.0112 '/' (101 Elevation Intervals)
Constant n= 0.040 Earth, cobble bottom, clean sides
Inlet Invert= 720.00', Outlet Invert= 707.00'

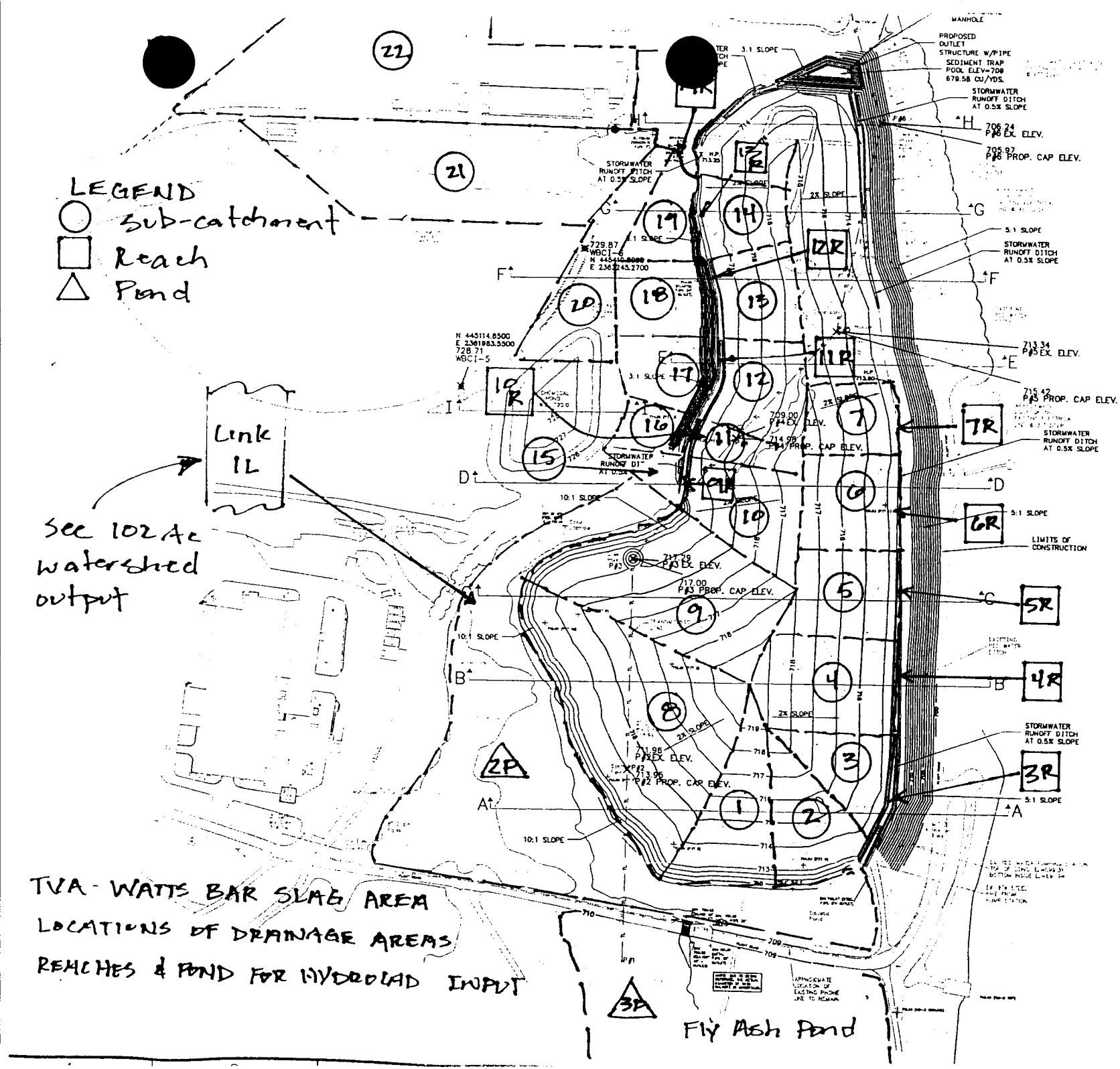


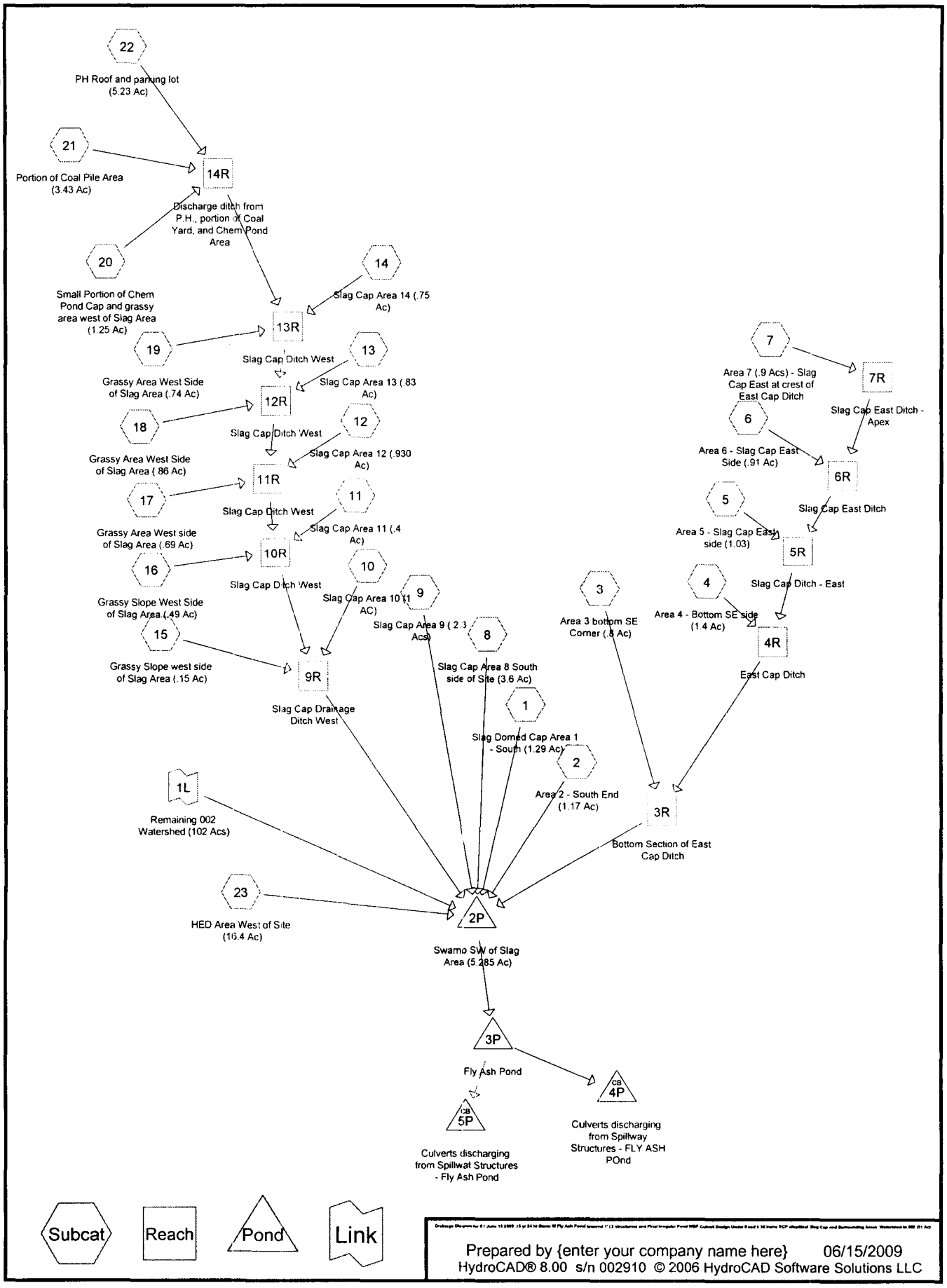
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	9.00	0.00
10.00	4.00	5.00
14.00	0.00	9.00
20.00	0.00	9.00
24.00	4.00	5.00
34.00	9.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
4.00	40.0	17.3	46,400	274.92
9.00	160.0	39.7	185,600	1,594.27

Reach D2R: Ditch at Coal Yard Area Base




LEGEND
Sub-catchment
Reach
Pond
Link 1L
See 102Ac watershed output
TVA - WATTS BAR SLAG AREA
LOCATIONS OF DRAINAGE AREAS
REACHES & POND FOR HYDROCAD INPUT
Fly Ash Pond
MANHOLE
PROPOSED OUTLET STRUCTURE W/PIPE
SEDIMENT TRAP POOL ELEV=709 670.58 CU/YDS.
STORMWATER RUNOFF DITCH AT 0.5% SLOPE
706.24 P#6 EX. ELEV.
705.92 P#6 PROP. CAP ELEV.
713.34 P#5 EX. ELEV.
715.42 P#5 PROP. CAP ELEV.
709.00 P#4 EX. ELEV.
714.98 P#4 PROP. CAP ELEV.
717.29 P#3 EX. ELEV.
717.00 P#3 PROP. CAP ELEV.
711.96 P#2 EX. ELEV.
713.96 P#2 PROP. CAP ELEV.
729.87 WBCI-6
N 445410.8000 E 2361245.2700
N 445114.8500 E 2361983.5500 728.71 WBCI-5
CHEMICAL FEED
3:1 SLOPE
5:1 SLOPE
10:1 SLOPE
2% SLOPE
LIMITS OF CONSTRUCTION
APPROXIMATE LOCATION OF EXISTING PHONE LINE TO REMAIN
1R
2R
10R
11R
12R
7R
6R
5R
4R
3R
2P
3P
GENERAL NOTES:
1. ALL WORK SHALL B CONSTRUCTION SPECI
2 EARTH BORROW FO ONSITE BORROW PIT ACHIEVE A PERMEABI COMPACTED SOIL COV AND SHALL BE AT LE (ASTM D-698). IN 2922) SHALL BE CHEC 5000 CY PLACED WIT FILL IS PLACED. FIL THE REQUIRED COMPA PERCENT MAXIMUM AE ADDITIONAL DETAILS
3. COMPACTED SOIL C TO 10 INCHES PRIOR
3. RIPRAP SHALL BE WEIGHT, OF THE STON WITH SECTION 575.
4. PIPE SHALL BE 24 PIPEAS NEEDED SHALL
5. EXCAVATION AND E TO SECTION 125.
6. TEMPORARY SEEDIN SECTION 583.
7. MULCHING SHALL M
8. FINAL SPRING SEEC PARTRIDC SWITCHGF LBS/ACRE SAND LO ON AREA GRASS AT
9. THE SEEDS ARE TO KEPT AT A TEMPERATU MINIMUM OF 30 DAYS CIRCULATE UNDER THE
10. SEEDS SHOULD BE DRILL" FIELD TO INC ROSS SKULURD (615) 7 PLANTING IS TO BE BE
11. THE SEED ARE NOT COOL STORAGE AREA B USED OVER THE AREA
12. SEEDED AREA TO BI OF PLANT MATERIAL IS AND PROTECTED AND RI AREAS HAVING A POOR FERTILIZED AT THE PR
13. BORROW AREA AND (TYPE B MIXTURE 1, FO SPRING SEEDING), FER SECTION 580 AND 582



Prepared by {enter your company name here} 06/15/2009
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Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.950	50	Coal Material (21)
3.180	65	Brush, Good, HSG C (15,16,17,18,19,20)
2.480	70	Brush, Fair, HSG C (21)
18.313	74	>75% Grass cover, Good, HSG C (1,2,3,4,5,6,7,8,9,10,11,12,13,14,20)
16.400	89	Gravel roads, HSG C (23)
5.230	91	Urban industrial, 72% imp, HSG C (22)
46.553		

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Slag Domed Cap Area 1 - South (1.29 Ac) Runoff Area=1.290 ac Runoff Depth>2.95"
Flow Length=530' Tc=35.3 min CN=74 Runoff=2.97 cfs 0.317 af

Subcatchment 2: Area 2 - South End (1.17 Ac) Runoff Area=1.170 ac Runoff Depth>2.95"
Flow Length=350' Tc=33.3 min CN=74 Runoff=2.81 cfs 0.287 af

Subcatchment 3: Area 3 bottom SE Corner (.8 Ac) Runoff Area=0.800 ac Runoff Depth>2.95"
Flow Length=300' Slope=0.0200 '/' Tc=32.9 min CN=74 Runoff=1.94 cfs 0.197 af

Subcatchment 4: Area 4 - Bottom SE side (1.4 Ac) Runoff Area=1.400 ac Runoff Depth>2.95"
Flow Length=340' Slope=0.0200 '/' Tc=33.6 min CN=74 Runoff=3.34 cfs 0.344 af

Subcatchment 5: Area 5 - Slag Cap East side (1.03) Runoff Area=1.030 ac Runoff Depth>2.95"
Flow Length=280' Slope=0.0200 '/' Tc=31.1 min CN=74 Runoff=2.59 cfs 0.253 af

Subcatchment 6: Area 6 - Slag Cap East Side (.91 Ac) Runoff Area=0.913 ac Runoff Depth>2.96"
Flow Length=220' Slope=0.0200 '/' Tc=25.6 min CN=74 Runoff=2.61 cfs 0.225 af

Subcatchment 7: Area 7 (.9 Acs) - Slag Cap East at crest of EB Runoff Area=0.900 ac Runoff Depth>2.96"
Flow Length=220' Slope=0.0200 '/' Tc=25.6 min CN=74 Runoff=2.57 cfs 0.222 af

Subcatchment 8: Slag Cap Area 8 South side of Site (3.6 Ac) Runoff Area=3.600 ac Runoff Depth>2.95"
Flow Length=530' Tc=36.1 min CN=74 Runoff=8.19 cfs 0.884 af

Subcatchment 9: Slag Cap Area 9 (2.3 Acs) Runoff Area=2.300 ac Runoff Depth>2.95"
Flow Length=550' Tc=34.9 min CN=74 Runoff=5.35 cfs 0.565 af

Subcatchment 10: Slag Cap Area 10 (1 AC) Runoff Area=1.000 ac Runoff Depth>2.95"
Flow Length=300' Slope=0.0200 '/' Tc=32.9 min CN=74 Runoff=2.42 cfs 0.246 af

Subcatchment 11: Slag Cap Area 11 (.4 Ac) Runoff Area=0.400 ac Runoff Depth>2.95"
Flow Length=250' Slope=0.0200 '/' Tc=28.4 min CN=74 Runoff=1.07 cfs 0.098 af

Subcatchment 12: Slag Cap Area 12 (.930 Ac) Runoff Area=0.930 ac Runoff Depth>2.95"
Flow Length=280' Slope=0.0200 '/' Tc=31.1 min CN=74 Runoff=2.34 cfs 0.229 af

Subcatchment 13: Slag Cap Area 13 (.83 Ac) Runoff Area=0.830 ac Runoff Depth>2.96"
Flow Length=190' Slope=0.0200 '/' Tc=22.8 min CN=74 Runoff=2.54 cfs 0.205 af

Subcatchment 14: Slag Cap Area 14 (.75 Ac) Runoff Area=0.750 ac Runoff Depth>2.96"
Flow Length=190' Slope=0.0200 '/' Tc=22.8 min CN=74 Runoff=2.29 cfs 0.185 af

Subcatchment 15: Grassy Slope west side of Slag Area (.15 A Runoff Area=0.150 ac Runoff Depth>2.16"
Flow Length=170' Slope=0.0290 '/' Tc=18.0 min CN=65 Runoff=0.37 cfs 0.027 af

Subcatchment 16: Grassy Slope West Side of Slag Area (.49 A Runoff Area=0.490 ac Runoff Depth>2.16"
Flow Length=210' Slope=0.0710 '/' Tc=14.9 min CN=65 Runoff=1.36 cfs 0.088 af

Subcatchment 17: Grassy Area West side of Slag Area (.69 AC) Runoff Area=0.690 ac Runoff Depth>2.16"
Flow Length=260' Slope=0.0650 '/' Tc=18.3 min CN=65 Runoff=1.71 cfs 0.124 af

Subcatchment 18: Grassy Area West Side of Slag Area (.86 AC Runoff Area=0.860 ac Runoff Depth>2.16"
Flow Length=210' Slope=0.0760 '/' Tc=14.5 min CN=65 Runoff=2.42 cfs 0.155 af

Subcatchment 19: Grassy Area West Side of Slag Area (.74 AC Runoff Area=0.740 ac Runoff Depth>2.16"
Flow Length=280' Slope=0.0460 '/' Tc=22.3 min CN=65 Runoff=1.63 cfs 0.133 af

Subcatchment 20: Small Portion of Chem Pond Cap and grass Runoff Area=1.250 ac Runoff Depth>2.75"
Flow Length=520' Tc=53.2 min CN=72 Runoff=2.00 cfs 0.286 af

Subcatchment 21: Portion of Coal Pile Area (3.43 Ac) Runoff Area=3.430 ac Runoff Depth>2.07"
Flow Length=860' Tc=24.4 min CN=64 Runoff=6.80 cfs 0.592 af

Subcatchment 22: PH Roof and parking lot (5.23 Ac) Runoff Area=5.230 ac Runoff Depth>4.70"
Flow Length=1,030' Tc=12.1 min CN=91 Runoff=32.99 cfs 2.049 af

Subcatchment 23: HED Area West of Site (16.4 Ac) Runoff Area=16.400 ac Runoff Depth>4.47"
Flow Length=2,225' Tc=23.9 min CN=89 Runoff=71.64 cfs 6.110 af

Reach 3R: Bottom Section of East Cap Ditc Avg. Depth=0.61' Max Vel=3.63 fps Inflow=12.84 cfs 1.237 af
n=0.022 L=240.0' S=0.0083 '/' Capacity=342.21 cfs Outflow=12.82 cfs 1.235 af

Reach 4R: East Cap Ditch Avg. Depth=0.64' Max Vel=2.89 fps Inflow=10.93 cfs 1.041 af
n=0.022 L=200.0' S=0.0050 '/' Capacity=265.07 cfs Outflow=10.91 cfs 1.040 af

Reach 5R: Slag Cap Ditch - East Avg. Depth=0.53' Max Vel=2.60 fps Inflow=7.67 cfs 0.698 af
n=0.022 L=200.0' S=0.0050 '/' Capacity=25.80 cfs Outflow=7.65 cfs 0.697 af

Reach 6R: Slag Cap East Ditch Avg. Depth=0.42' Max Vel=2.30 fps Inflow=5.16 cfs 0.446 af
n=0.022 L=200.0' S=0.0050 '/' Capacity=25.80 cfs Outflow=5.13 cfs 0.445 af

Reach 7R: Slag Cap East Ditch - Apex Avg. Depth=0.29' Max Vel=1.84 fps Inflow=2.57 cfs 0.222 af
n=0.022 L=160.0' S=0.0050 '/' Capacity=6.94 cfs Outflow=2.55 cfs 0.221 af

Reach 9R: Slag Cap Drainage Ditch West Avg. Depth=0.44' Max Vel=2.84 fps Inflow=51.25 cfs 4.403 af
n=0.022 L=90.0' S=0.0056 '/' Capacity=1,786.48 cfs Outflow=51.21 cfs 4.400 af

Reach 10R: Slag Cap Ditch West Avg. Depth=0.98' Max Vel=4.22 fps Inflow=49.16 cfs 4.132 af
n=0.022 L=90.0' S=0.0056 '/' Capacity=675.08 cfs Outflow=49.14 cfs 4.130 af

Reach 11R: Slag Cap Ditch West Avg. Depth=0.95' Max Vel=4.16 fps Inflow=47.09 cfs 3.949 af
n=0.022 L=180.0' S=0.0056 '/' Capacity=390.36 cfs Outflow=46.99 cfs 3.945 af

Reach 12R: Slag Cap Ditch West Avg. Depth=1.20' Max Vel=3.03 fps Inflow=44.52 cfs 3.600 af
n=0.030 L=190.0' S=0.0053 '/' Capacity=152.93 cfs Outflow=43.72 cfs 3.596 af

Reach 13R: Slag Cap Ditch West Avg. Depth=1.47' Max Vel=2.82 fps Inflow=40.62 cfs 3.244 af
n=0.030 L=225.0' S=0.0056 '/' Capacity=113.10 cfs Outflow=39.93 cfs 3.240 af

Reach 14R: Discharge ditch from P.H., port Avg. Depth=0.55' Max Vel=7.49 fps Inflow=37.68 cfs 2.927 af
n=0.030 L=115.0' S=0.0609 '/' Capacity=369.91 cfs Outflow=37.68 cfs 2.926 af

Pond 2P: Swamp SW of Slag Area (5.285 Peak Elev=707.90' Storage=0.670 af Inflow=161.07 cfs 33.886 af
30.0" x 35.0' Culvert Outflow=146.97 cfs 33.886 af

Pond 3P: Fly Ash Pond Peak Elev=705.80' Storage=6.734 af Inflow=146.97 cfs 33.886 af
Primary=93.22 cfs 32.442 af Secondary=0.00 cfs 0.000 af Outflow=93.22 cfs 32.442 af

Pond 4P: Culverts discharging from Spillway Structures - Peak Elev=692.22' Inflow=93.22 cfs 32.442 af
36.0" x 124.0' Culvert Outflow=93.22 cfs 32.442 af

Pond 5P: Culverts discharging from Spillwat Structures - Fly Peak Elev=688.00' Inflow=0.00 cfs 0.000 af
36.0" x 124.0' Culvert Outflow=0.00 cfs 0.000 af

Link 1L: Outflow Imported from Remaining 002 Watershed (102 Acs)~Reach 1R Inflow=80.34 cfs 20.088 af
Primary=80.34 cfs 20.088 af

Total Runoff Area = 46.553 ac Runoff Volume = 13.820 af Average Runoff Depth = 3.56"
91.91% Pervious Area = 42.787 ac 8.09% Impervious Area = 3.766 ac

Subcatchment 1: Slag Domed Cap Area 1 - South (1.29 Ac)

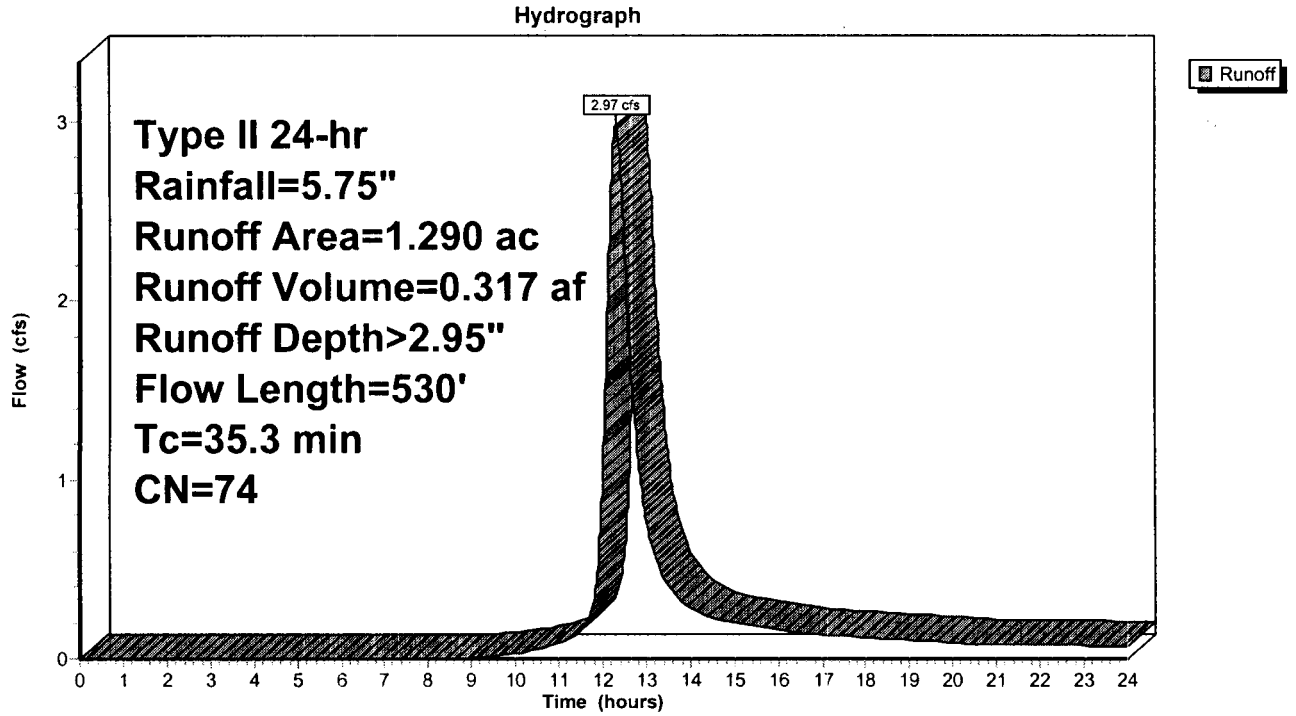
Runoff = 2.97 cfs @ 12.31 hrs, Volume= 0.317 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
1.290	74	>75% Grass cover, Good, HSG C
1.290		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, 2% Cap Slope w/ 2% slope** Grass: Dense n= 0.240 P2= 3.50"
2.4	230	0.0500	1.57		**Shallow Concentrated Flow, Bottom portion of Area 1** Short Grass Pasture Kv= 7.0 fps
35.3	530	Total			

Subcatchment 1: Slag Domed Cap Area 1 - South (1.29 Ac)



Subcatchment 2: Area 2 - South End (1.17 Ac)

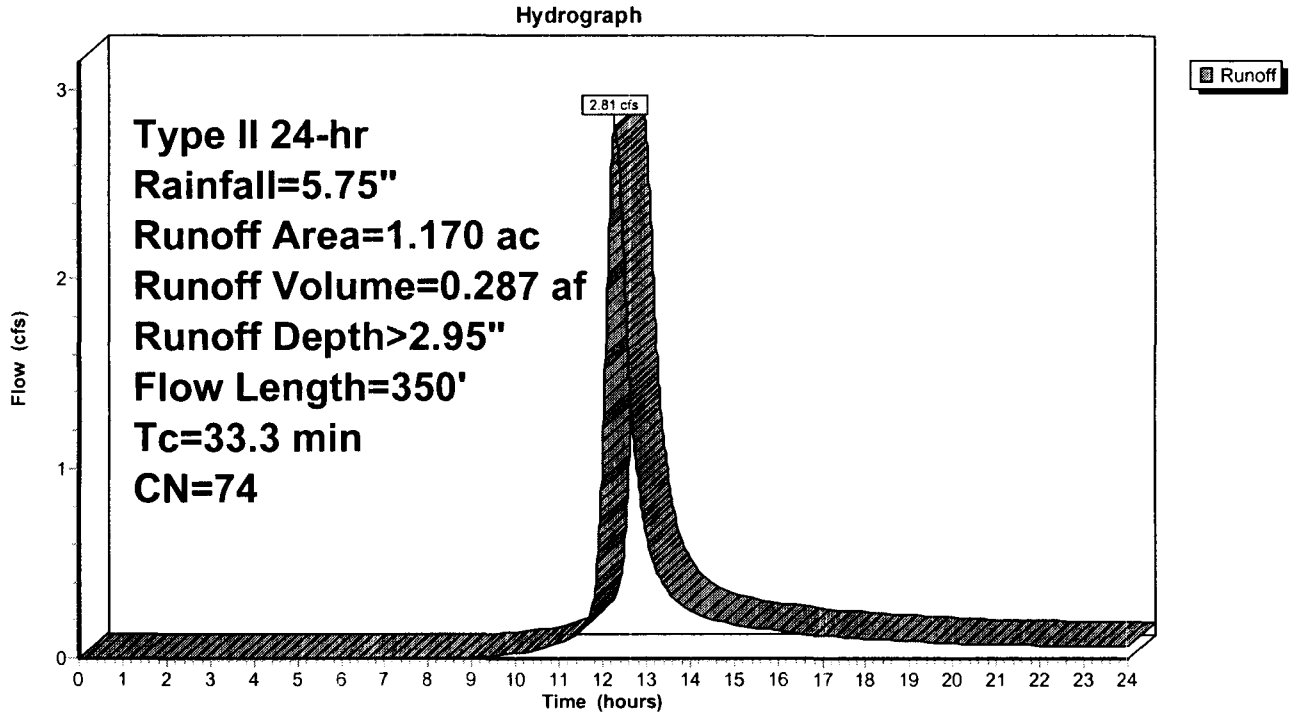
Runoff = 2.81 cfs @ 12.28 hrs, Volume= 0.287 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
1.170	74	>75% Grass cover, Good, HSG C
1.170		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, Top Half of subcatchment** Grass: Dense n= 0.240 P2= 3.50"
0.4	50	0.1000	2.21		**Shallow Concentrated Flow, Bottom half of subcatchment** Short Grass Pasture Kv= 7.0 fps
33.3	350	Total			

Subcatchment 2: Area 2 - South End (1.17 Ac)



Subcatchment 3: Area 3 bottom SE Corner (.8 Ac)

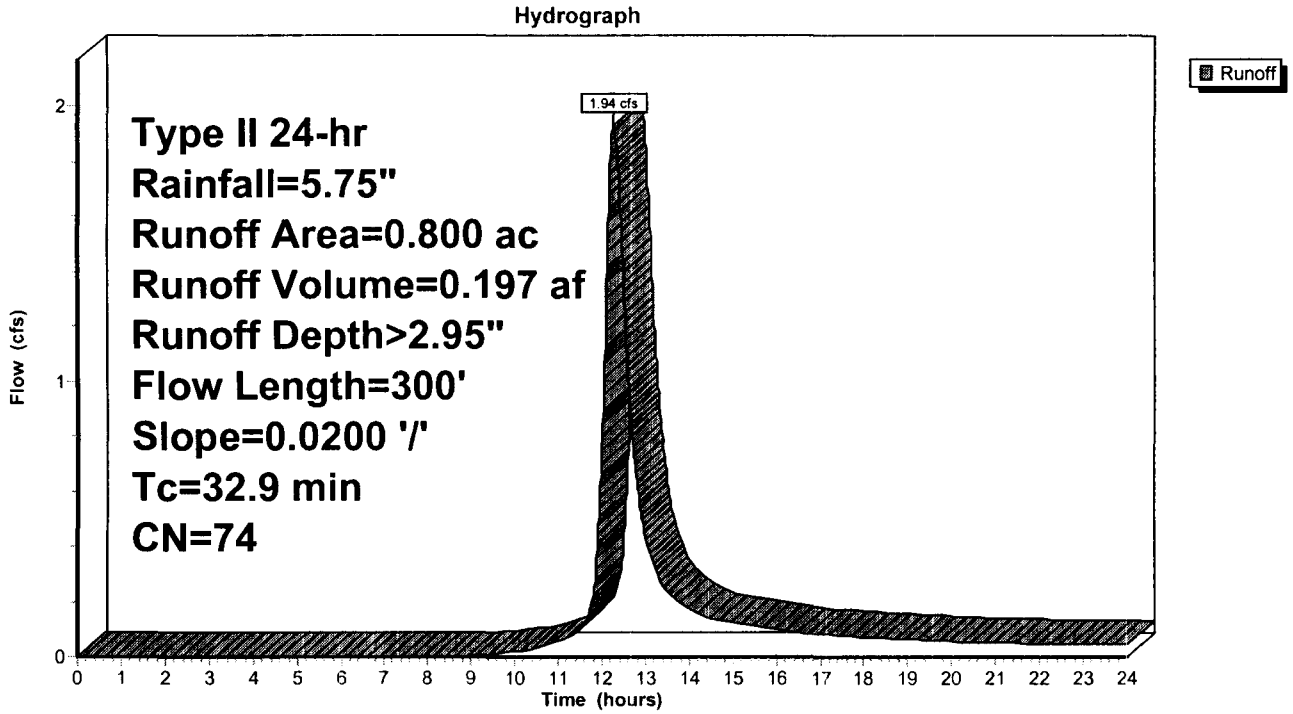
Runoff = 1.94 cfs @ 12.28 hrs, Volume= 0.197 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, Flow on Cap to perimeter ditch** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 3: Area 3 bottom SE Corner (.8 Ac)



Subcatchment 4: Area 4 - Bottom SE side (1.4 Ac)

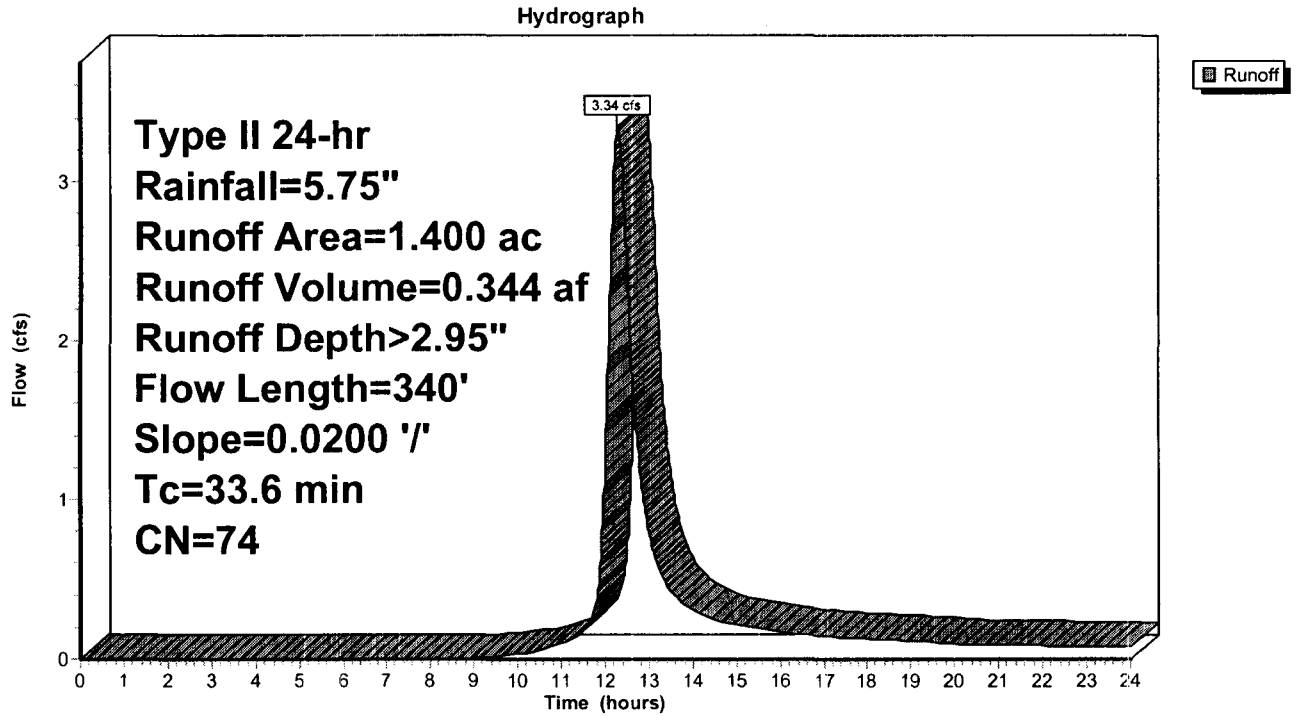
Runoff = 3.34 cfs @ 12.28 hrs, Volume= 0.344 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
1.400	74	>75% Grass cover, Good, HSG C
1.400		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, Top portion of Area** Grass: Dense n= 0.240 P2= 3.50"
0.7	40	0.0200	0.99		**Shallow Concentrated Flow, Bottom portion** Short Grass Pasture Kv= 7.0 fps
33.6	340	Total			

Subcatchment 4: Area 4 - Bottom SE side (1.4 Ac)



Subcatchment 5: Area 5 - Slag Cap East side (1.03)

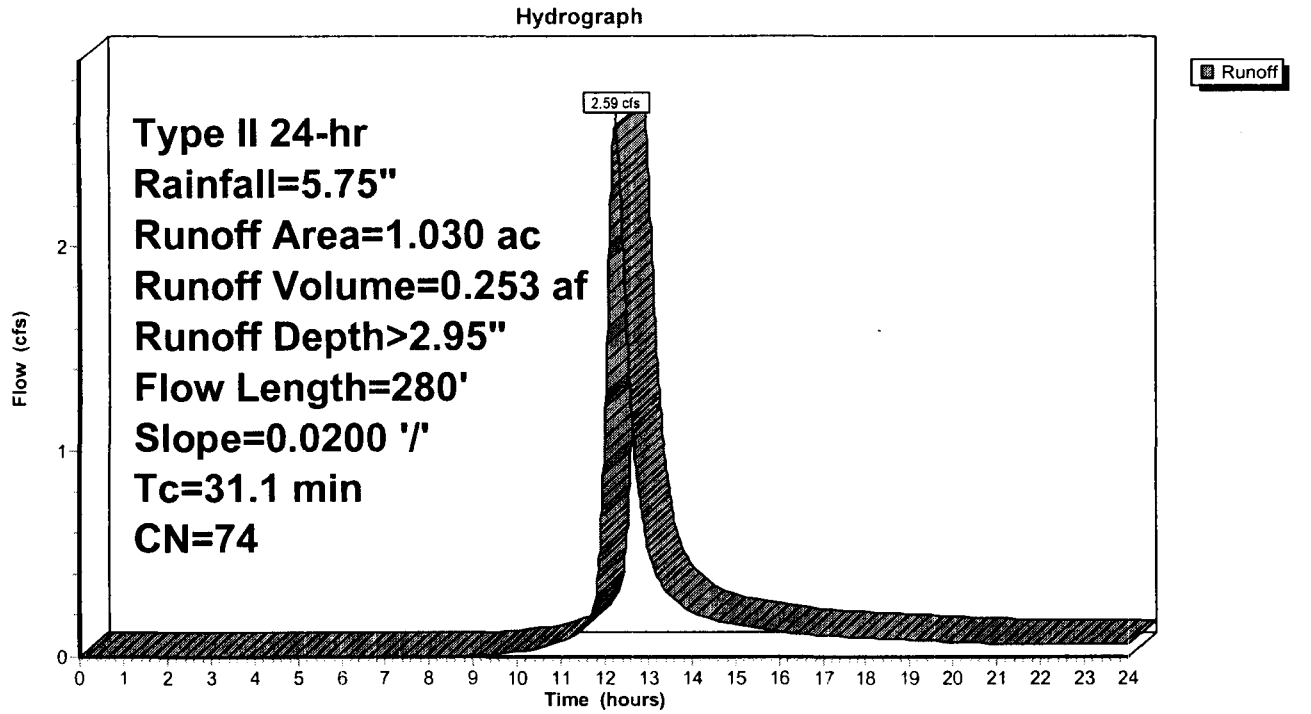
Runoff = 2.59 cfs @ 12.27 hrs, Volume= 0.253 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
1.030	74	>75% Grass cover, Good, HSG C
1.030		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.1	280	0.0200	0.15		**Sheet Flow, Cap surface grassed** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 5: Area 5 - Slag Cap East side (1.03)



Subcatchment 6: Area 6 - Slag Cap East Side (.91 Ac)

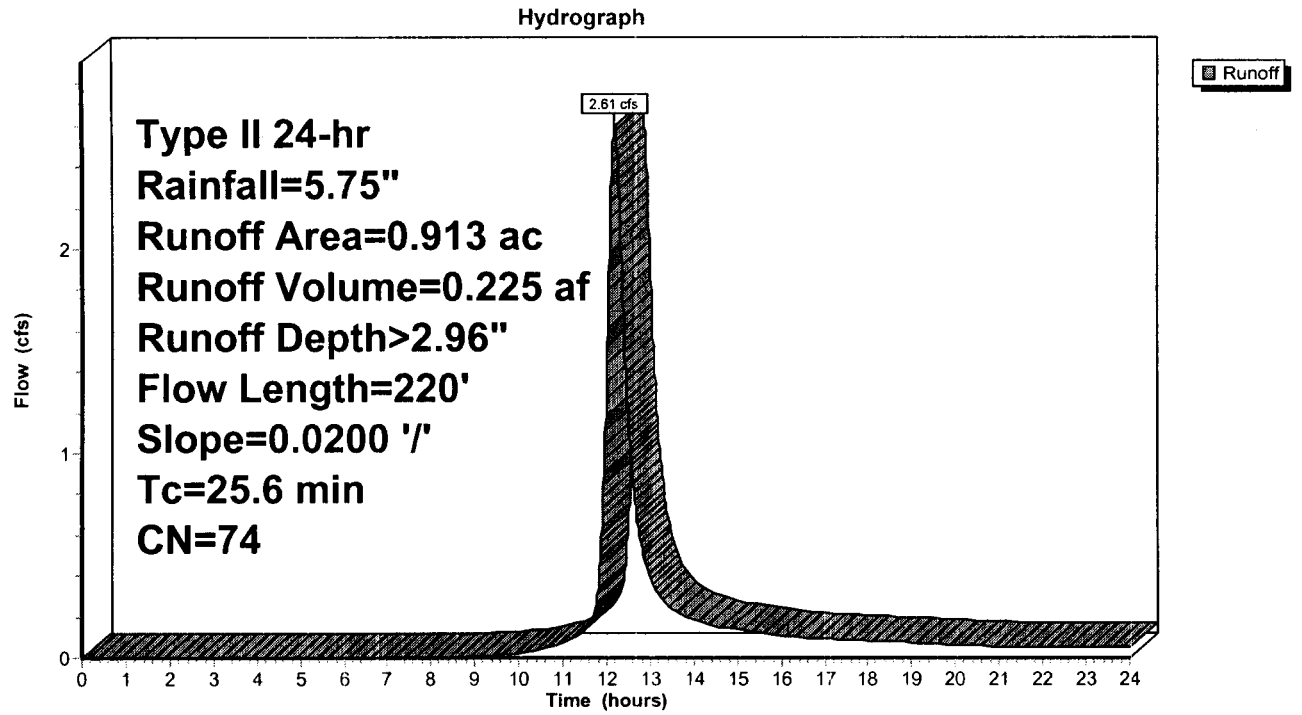
Runoff = 2.61 cfs @ 12.20 hrs, Volume= 0.225 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.913	74	>75% Grass cover, Good, HSG C
0.913		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	220	0.0200	0.14		**Sheet Flow, Slag Cap grassed** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 6: Area 6 - Slag Cap East Side (.91 Ac)



Subcatchment 7: Area 7 (.9 Acs) - Slag Cap East at crest of East Cap Ditch

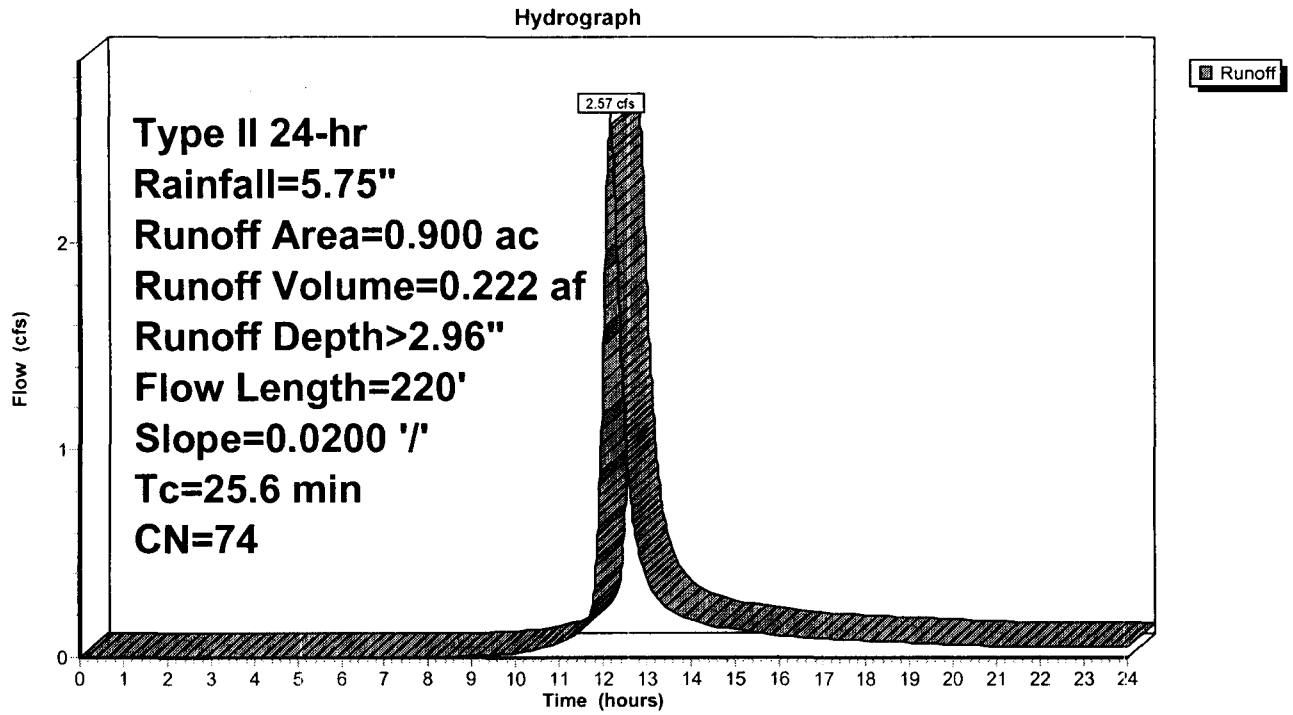
Runoff = 2.57 cfs @ 12.20 hrs, Volume= 0.222 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.900	74	>75% Grass cover, Good, HSG C
0.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	220	0.0200	0.14		**Sheet Flow, Slag Cap Run-off** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 7: Area 7 (.9 Acs) - Slag Cap East at crest of East Cap Ditch



Subcatchment 8: Slag Cap Area 8 South side of Site (3.6 Ac)

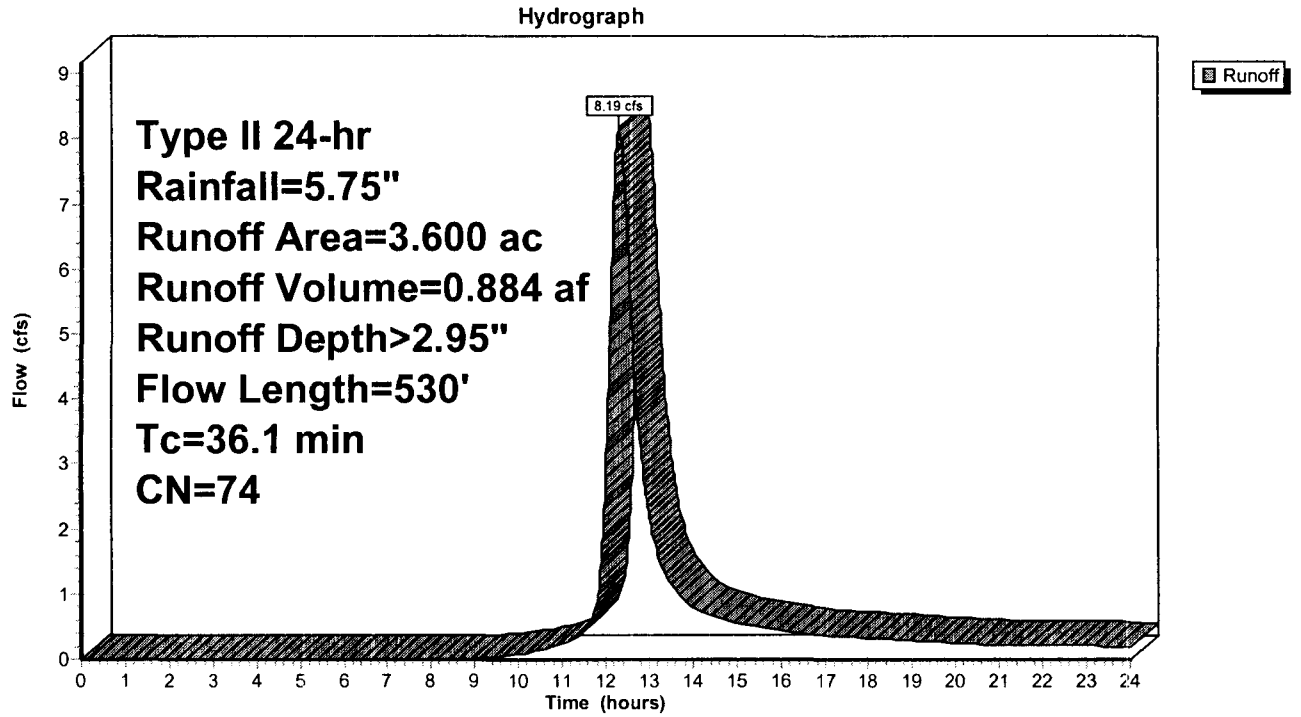
Runoff = 8.19 cfs @ 12.32 hrs, Volume= 0.884 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
3.600	74	>75% Grass cover, Good, HSG C
3.600		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, Top portion of cap** Grass: Dense n= 0.240 P2= 3.50"
3.2	230	0.0300	1.21		**Shallow Concentrated Flow, Lower portion** Short Grass Pasture Kv= 7.0 fps
36.1	530	Total			

Subcatchment 8: Slag Cap Area 8 South side of Site (3.6 Ac)



Subcatchment 9: Slag Cap Area 9 (2.3 Acs)

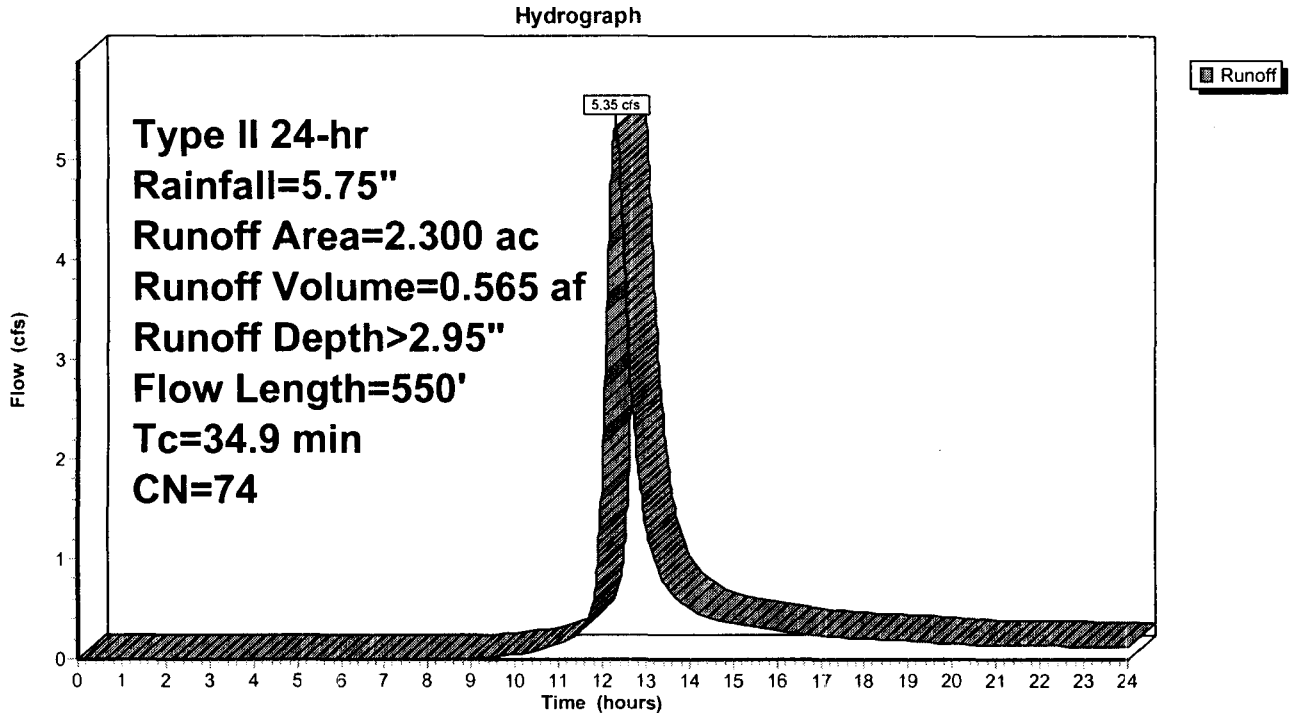
Runoff = 5.35 cfs @ 12.30 hrs, Volume= 0.565 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
2.300	74	>75% Grass cover, Good, HSG C
2.300		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, top portion of cap** Grass: Dense n= 0.240 P2= 3.50"
2.0	250	0.0900	2.10		**Shallow Concentrated Flow, bottom portion** Short Grass Pasture Kv= 7.0 fps
34.9	550	Total			

Subcatchment 9: Slag Cap Area 9 (2.3 Acs)



Subcatchment 10: Slag Cap Area 10 (1 AC)

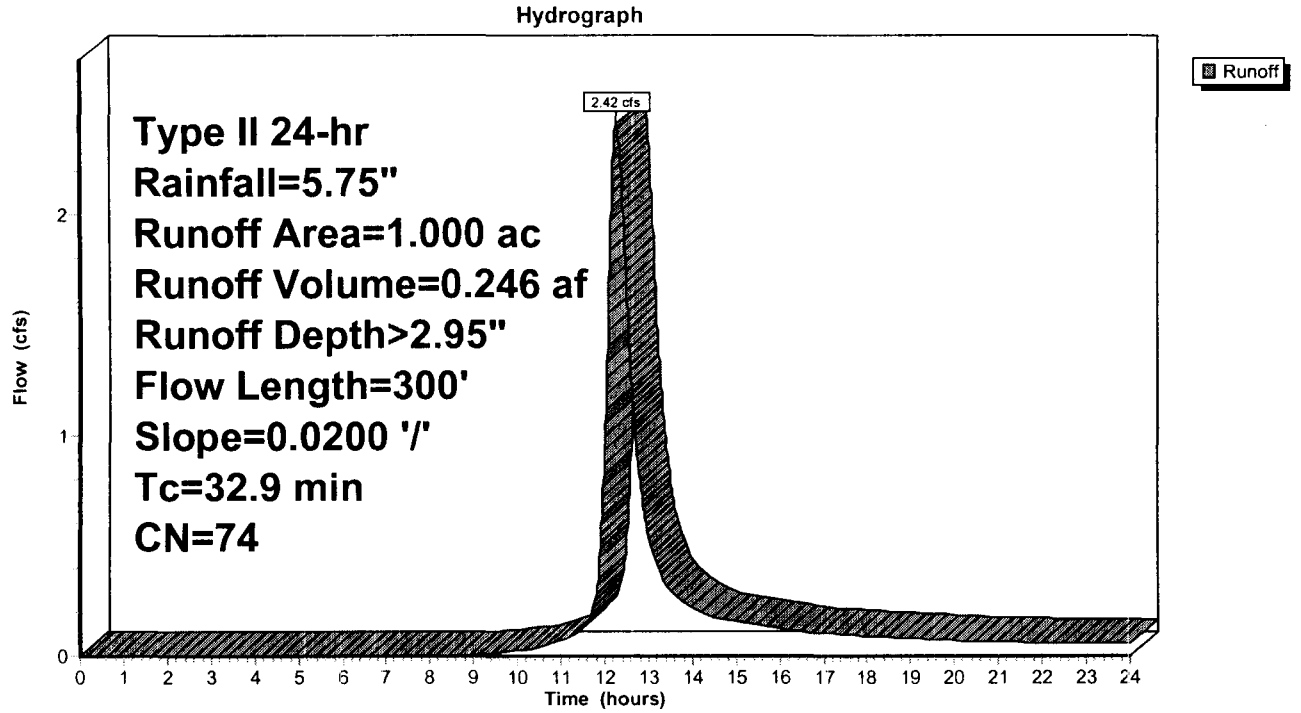
Runoff = 2.42 cfs @ 12.28 hrs, Volume= 0.246 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
1.000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.9	300	0.0200	0.15		**Sheet Flow, Slag Cap** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 10: Slag Cap Area 10 (1 AC)



Subcatchment 11: Slag Cap Area 11 (.4 Ac)

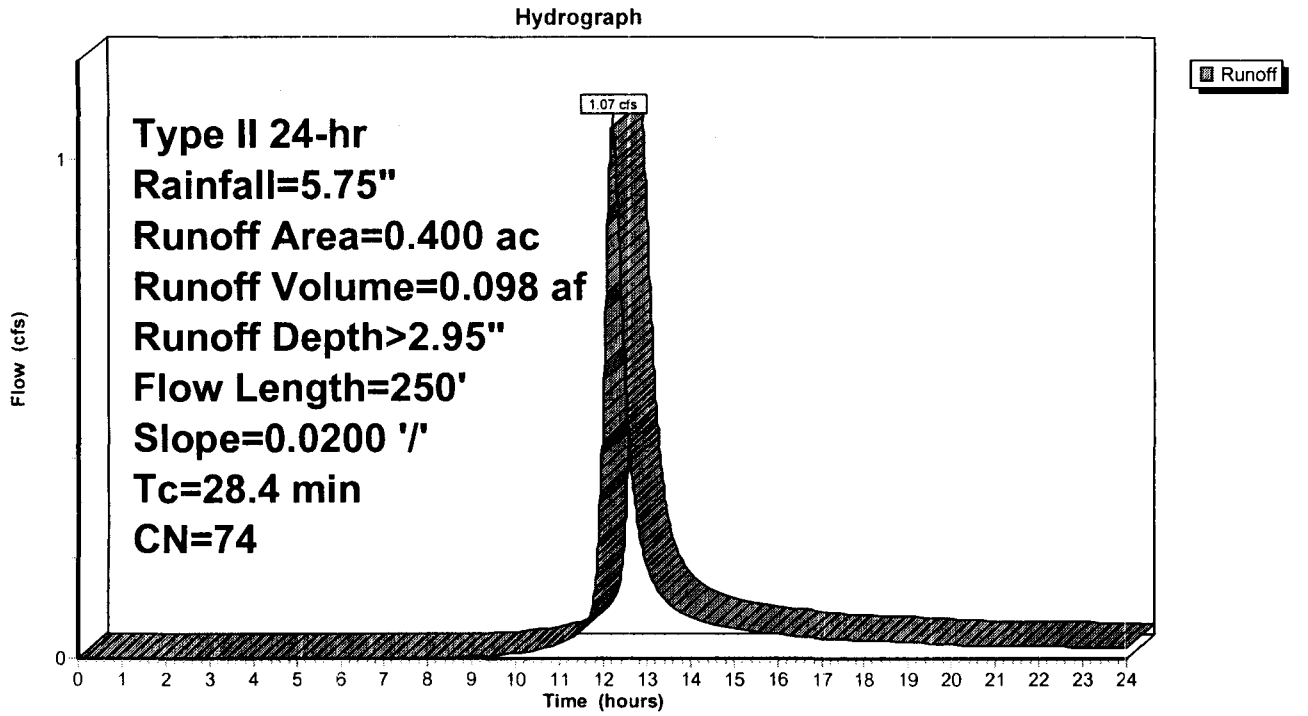
Runoff = 1.07 cfs @ 12.22 hrs, Volume= 0.098 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.400		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.4	250	0.0200	0.15		**Sheet Flow, Drainage on cap** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 11: Slag Cap Area 11 (.4 Ac)



Subcatchment 12: Slag Cap Area 12 (.930 Ac)

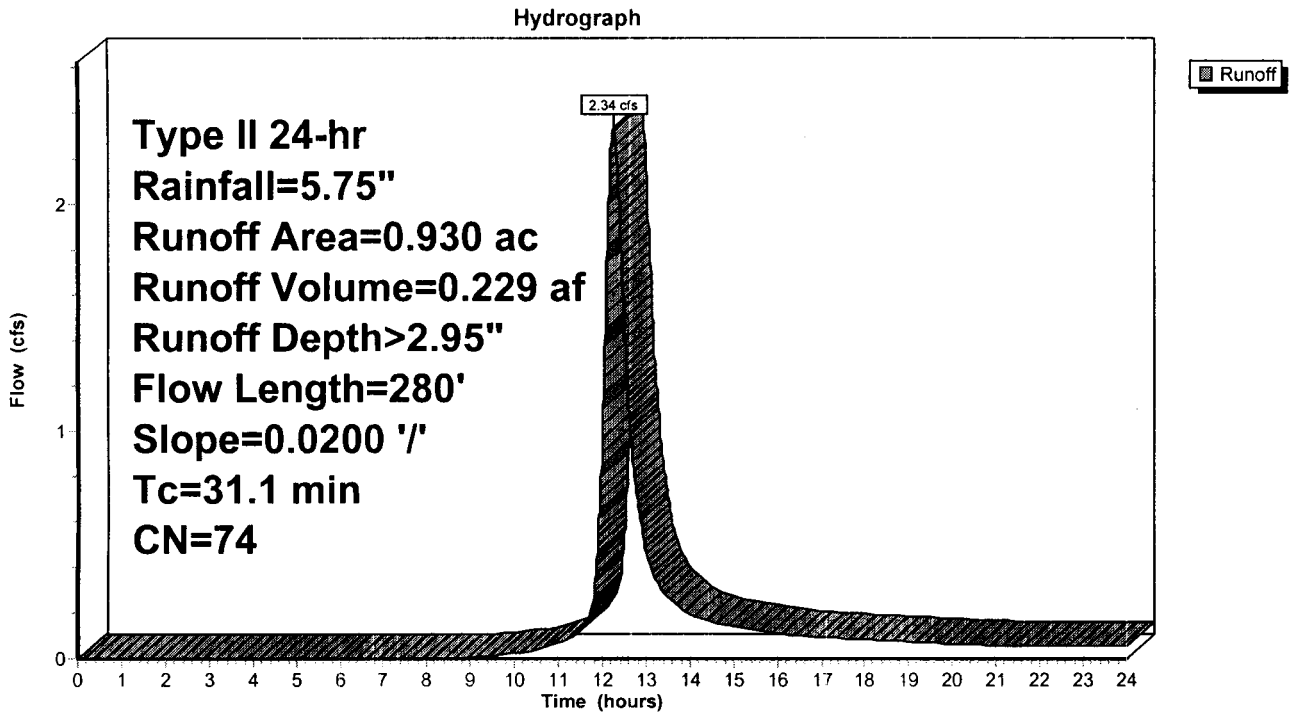
Runoff = 2.34 cfs @ 12.27 hrs, Volume= 0.229 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.930	74	>75% Grass cover, Good, HSG C
0.930		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.1	280	0.0200	0.15		**Sheet Flow, Slag Cap** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 12: Slag Cap Area 12 (.930 Ac)



Subcatchment 13: Slag Cap Area 13 (.83 Ac)

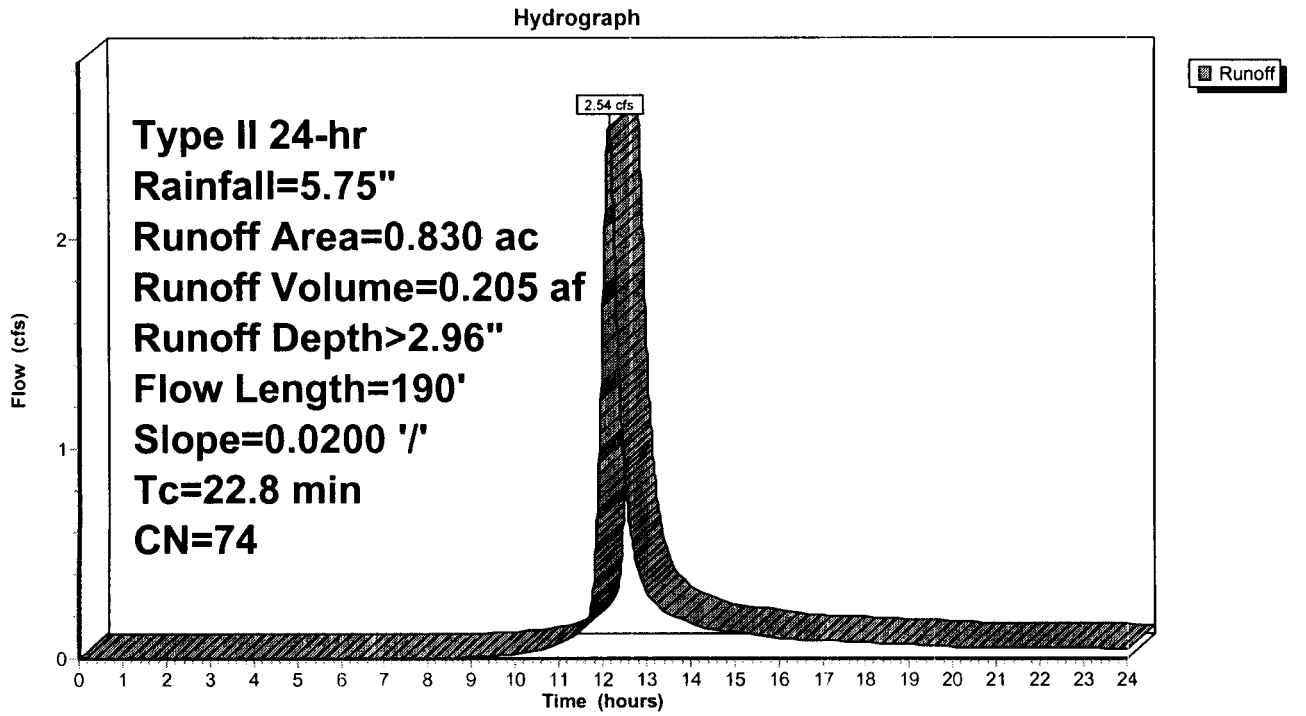
Runoff = 2.54 cfs @ 12.16 hrs, Volume= 0.205 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.830	74	>75% Grass cover, Good, HSG C
0.830		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	190	0.0200	0.14		**Sheet Flow, Slag Cap runoff** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 13: Slag Cap Area 13 (.83 Ac)



Subcatchment 14: Slag Cap Area 14 (.75 Ac)

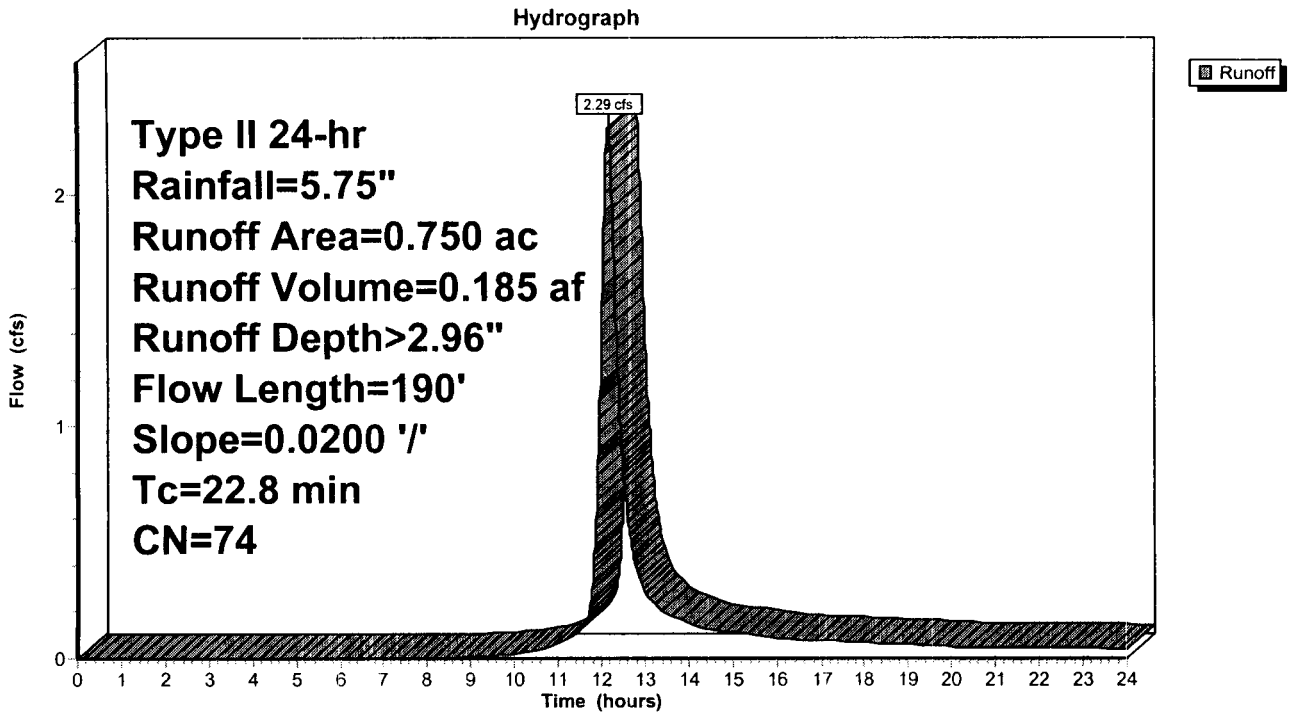
Runoff = 2.29 cfs @ 12.16 hrs, Volume= 0.185 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.750	74	>75% Grass cover, Good, HSG C
0.750		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	190	0.0200	0.14		**Sheet Flow, Slag Cap Drainage** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 14: Slag Cap Area 14 (.75 Ac)



Subcatchment 15: Grassy Slope west side of Slag Area (.15 Ac)

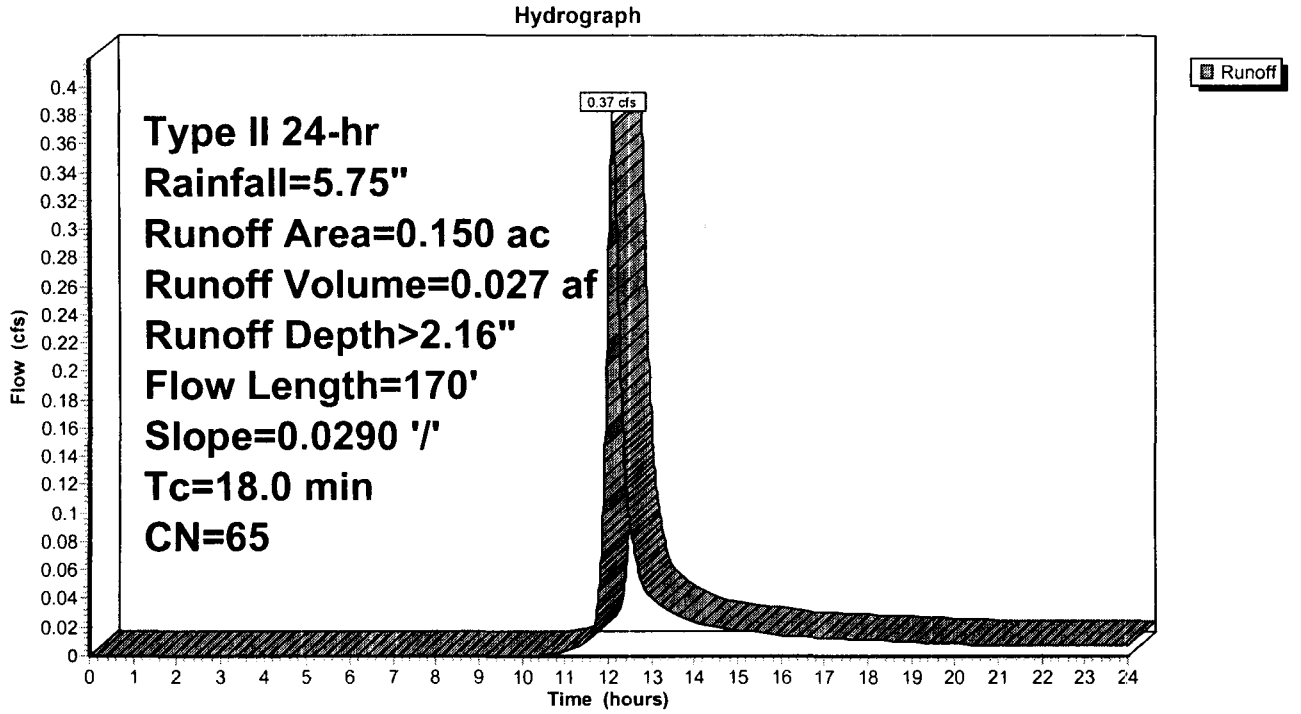
Runoff = 0.37 cfs @ 12.11 hrs, Volume= 0.027 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.150	65	Brush, Good, HSG C
0.150		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	170	0.0290	0.16		**Sheet Flow, Undisturbed Slope west of Slag Area** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 15: Grassy Slope west side of Slag Area (.15 Ac)



Subcatchment 16: Grassy Slope West Side of Slag Area (.49 Ac)

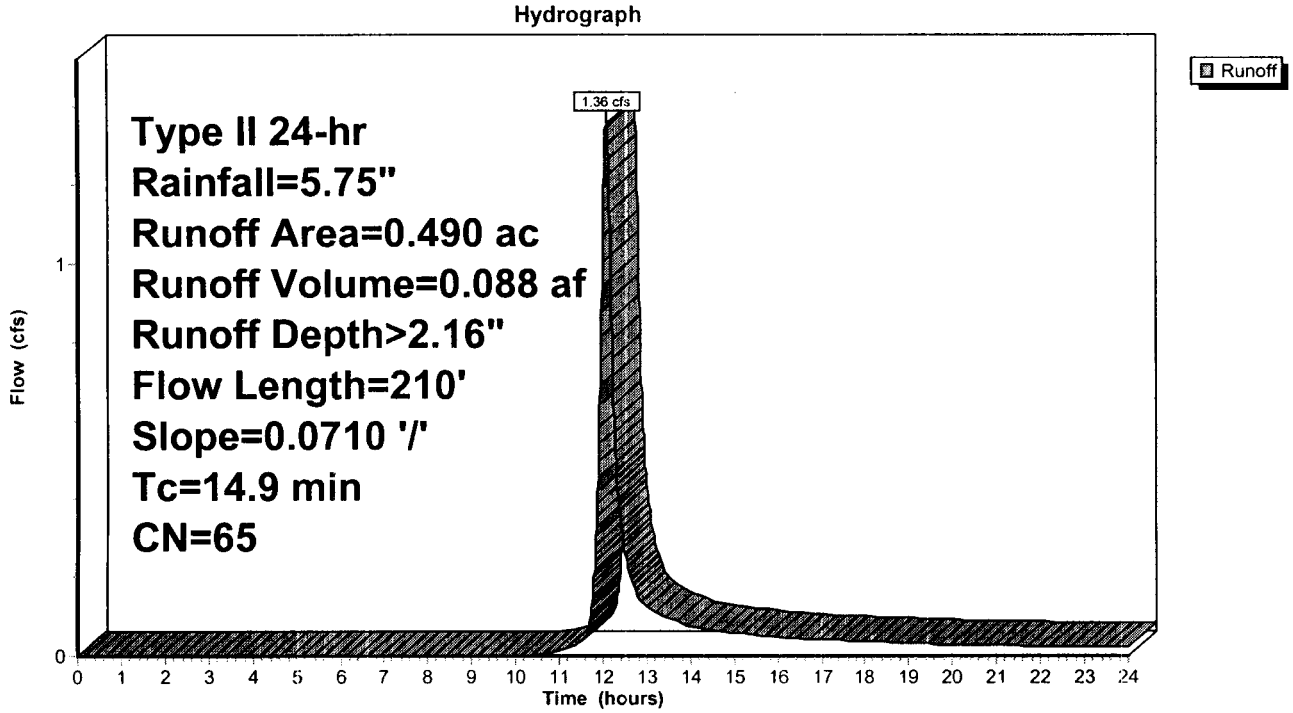
Runoff = 1.36 cfs @ 12.07 hrs, Volume= 0.088 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.490	65	Brush, Good, HSG C
0.490		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	210	0.0710	0.24		**Sheet Flow, Grassy Area next to Slag Cap west ditch** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 16: Grassy Slope West Side of Slag Area (.49 Ac)



Subcatchment 17: Grassy Area West side of Slag Area (.69 Ac)

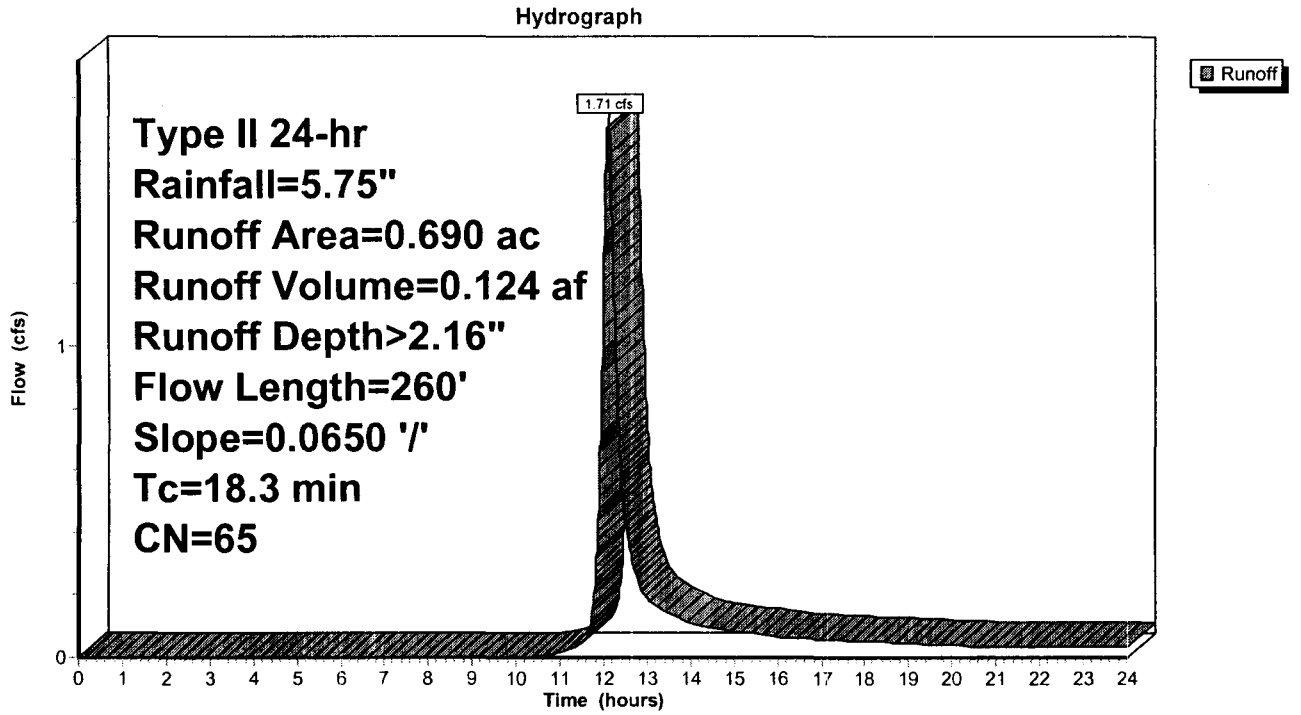
Runoff = 1.71 cfs @ 12.12 hrs, Volume= 0.124 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.690	65	Brush, Good, HSG C
0.690		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	260	0.0650	0.24		**Sheet Flow, Grassy Area West of Slag Area** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 17: Grassy Area West side of Slag Area (.69 Ac)



Subcatchment 18: Grassy Area West Side of Slag Area (.86 Ac)

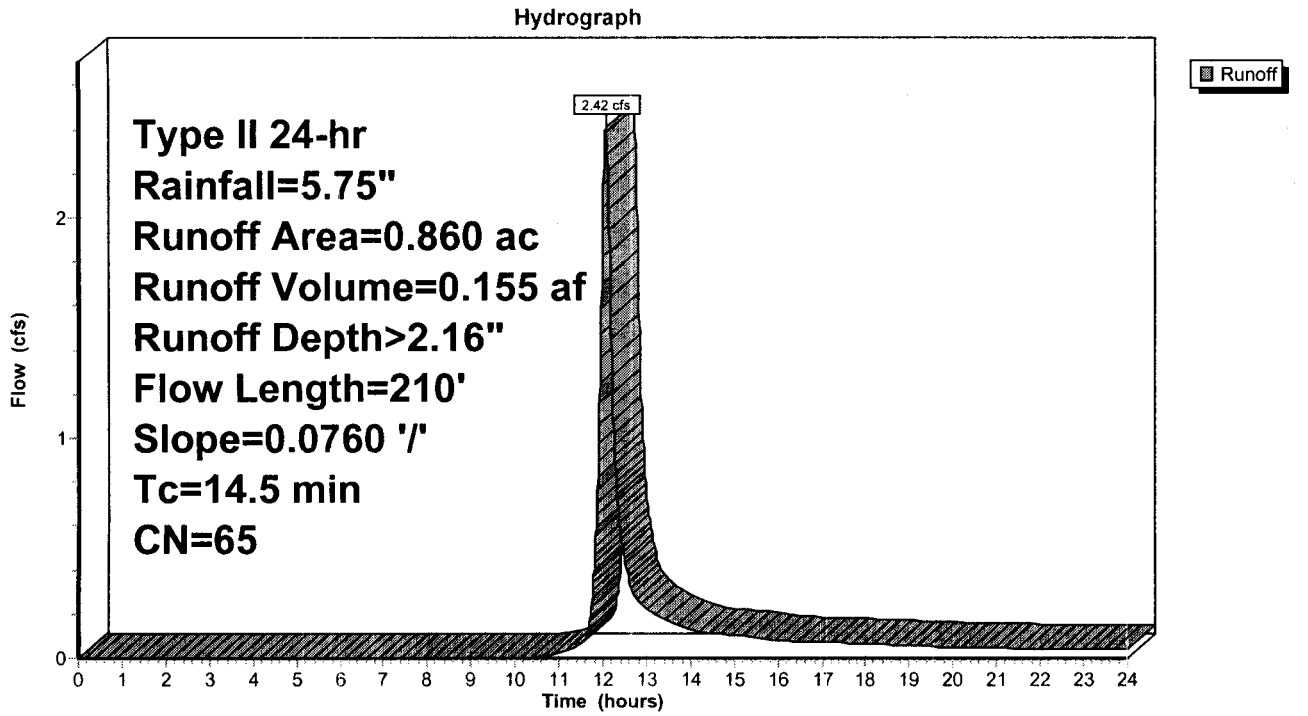
Runoff = 2.42 cfs @ 12.07 hrs, Volume= 0.155 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.860	65	Brush, Good, HSG C
0.860		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	210	0.0760	0.24		**Sheet Flow, Grassy Area West of Slag Area** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 18: Grassy Area West Side of Slag Area (.86 Ac)



Subcatchment 19: Grassy Area West Side of Slag Area (.74 Ac)

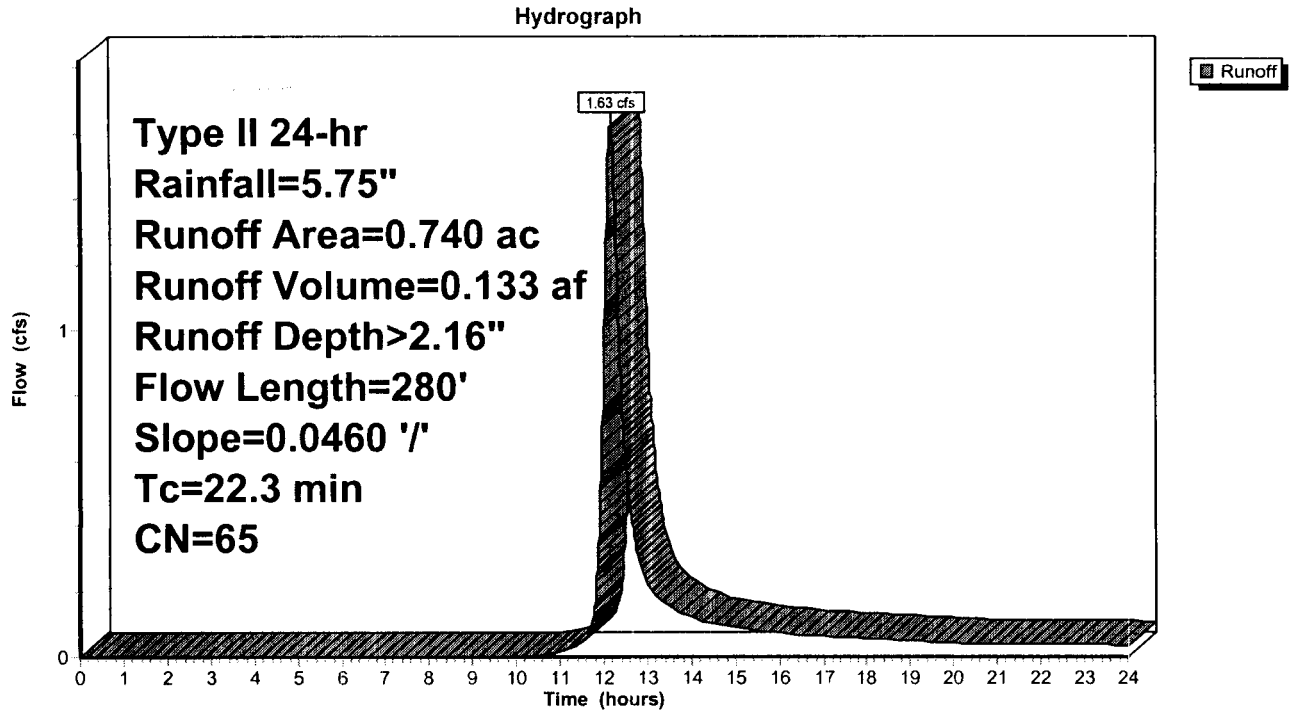
Runoff = 1.63 cfs @ 12.16 hrs, Volume= 0.133 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.740	65	Brush, Good, HSG C
0.740		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	280	0.0460	0.21		**Sheet Flow, Grassy Area West of Slag Area** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment 19: Grassy Area West Side of Slag Area (.74 Ac)



Subcatchment 20: Small Portion of Chem Pond Cap and grassy area west of Slag Area (1.25 Ac

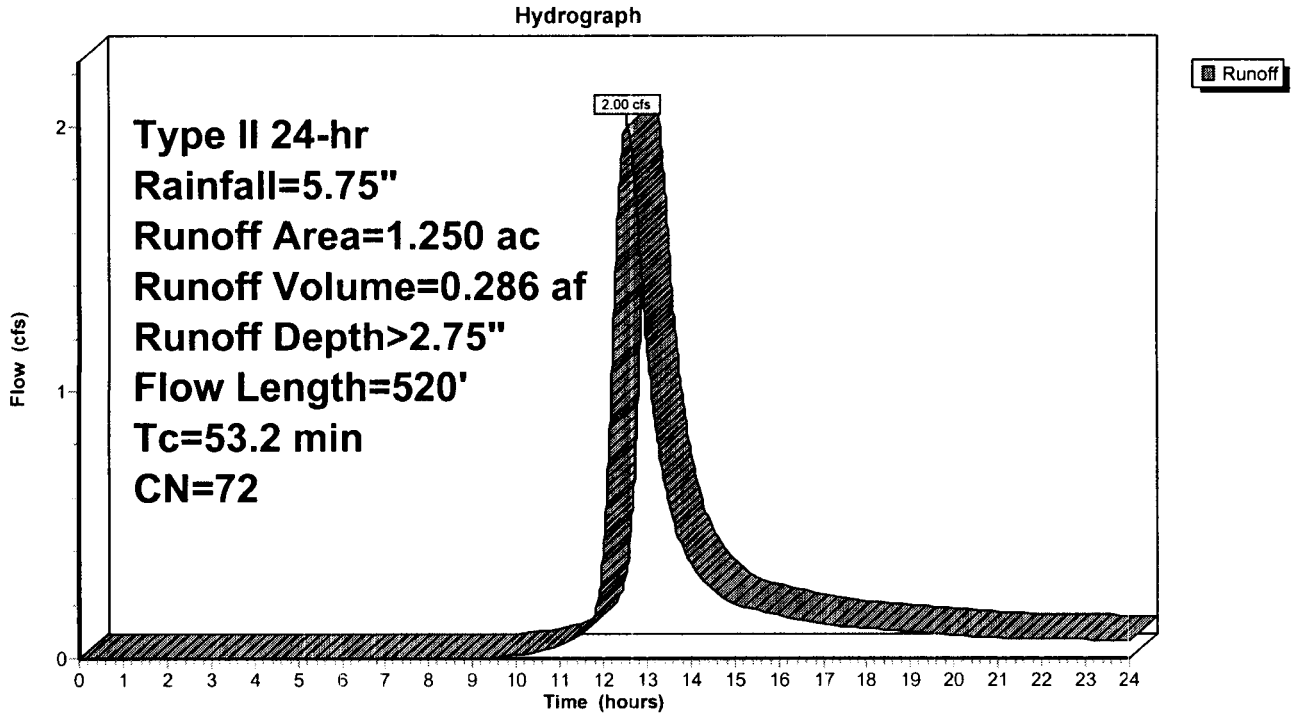
Runoff = 2.00 cfs @ 12.54 hrs, Volume= 0.286 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.250	65	Brush, Good, HSG C
1.250	72	Weighted Average
1.250		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
50.0	300	0.0070	0.10		**Sheet Flow, Upper portion - chem pond cap plus grassy area** Grass: Dense n= 0.240 P2= 3.50"
3.2	220	0.0270	1.15		**Shallow Concentrated Flow, Lower portion of area** Short Grass Pasture Kv= 7.0 fps
53.2	520	Total			

Subcatchment 20: Small Portion of Chem Pond Cap and grassy area west of Slag Area (1.25 Ac



Subcatchment 21: Portion of Coal Pile Area (3.43 Ac)

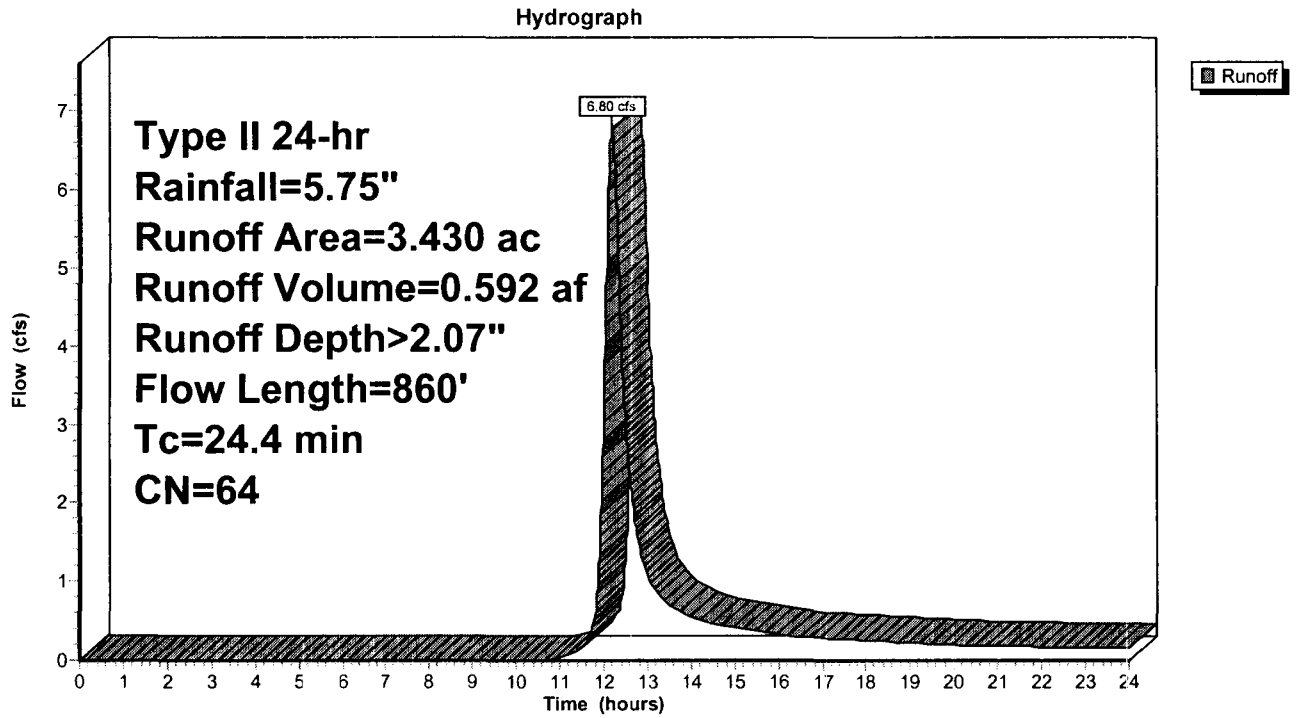
Runoff = 6.80 cfs @ 12.18 hrs, Volume= 0.592 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.950	50	Coal Material
2.480	70	Brush, Fair, HSG C
3.430	64	Weighted Average
3.430		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	300	0.0030	0.25		**Sheet Flow, Upper Portion of Area - Mostly Coal Yard** Fallow n= 0.050 P2= 3.50"
4.4	560	0.0200	2.12		**Shallow Concentrated Flow, Lower Portion of Area** Grassed Waterway Kv= 15.0 fps
24.4	860	Total			

Subcatchment 21: Portion of Coal Pile Area (3.43 Ac)



Subcatchment 22: PH Roof and parking lot (5.23 Ac)

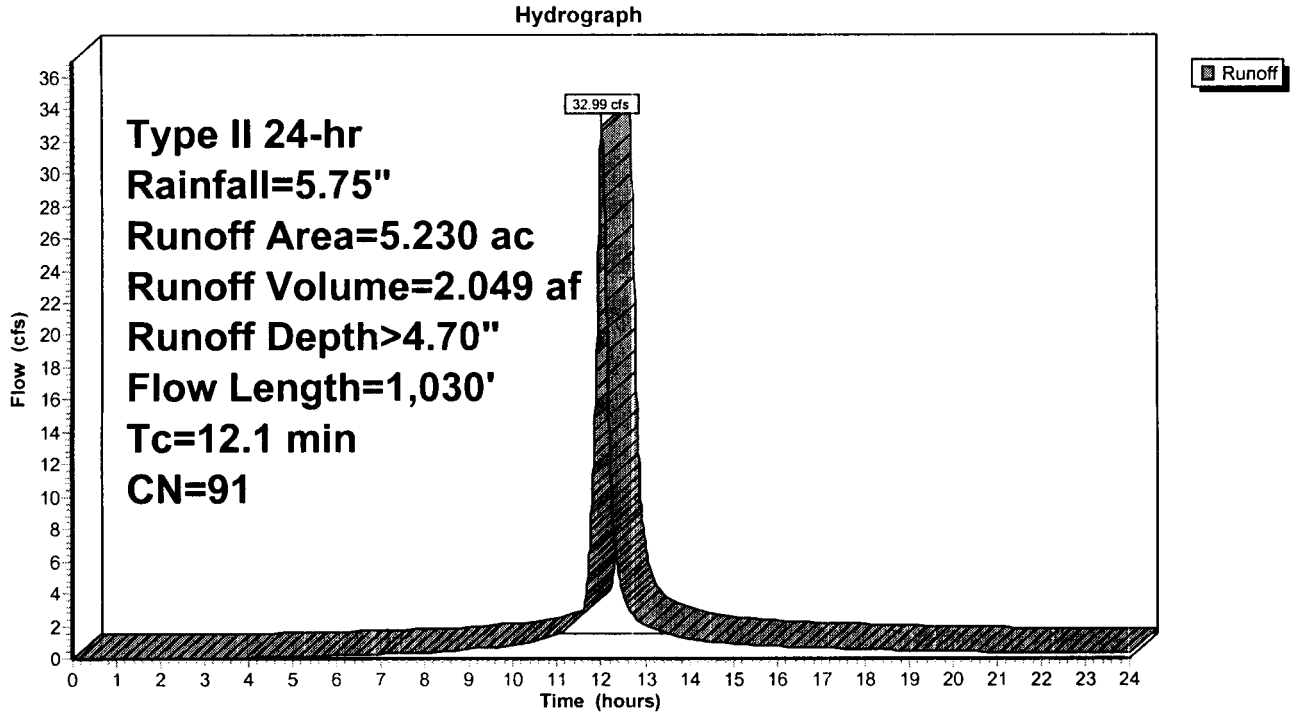
Runoff = 32.99 cfs @ 12.03 hrs, Volume= 2.049 af, Depth> 4.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
5.230	91	Urban industrial, 72% imp, HSG C
1.464		Pervious Area
3.766		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	300	0.0020	0.71		**Sheet Flow, Upper Portion of Area** Smooth surfaces n= 0.011 P2= 3.50"
5.1	730	0.0140	2.40		**Shallow Concentrated Flow, Lower Portion** Paved Kv= 20.3 fps
12.1	1,030	Total			

Subcatchment 22: PH Roof and parking lot (5.23 Ac)



Subcatchment 23: HED Area West of Site (16.4 Ac)

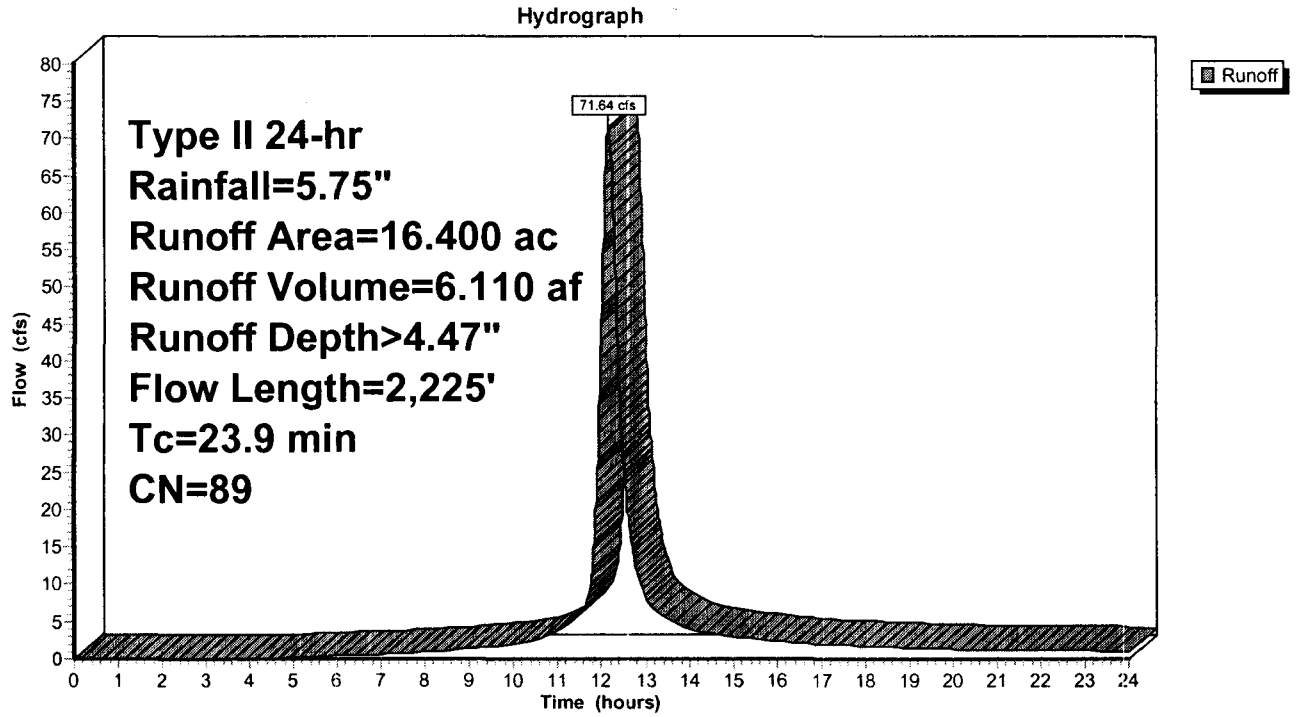
Runoff = 71.64 cfs @ 12.16 hrs, Volume= 6.110 af, Depth> 4.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
16.400	89	Gravel roads, HSG C
16.400		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	300	0.0050	1.03		**Sheet Flow, beginning portion** n= 0.011 P2= 3.50"
19.0	1,925	0.0110	1.69		**Shallow Concentrated Flow, Lower Portion** Unpaved Kv= 16.1 fps
23.9	2,225	Total			

Subcatchment 23: HED Area West of Site (16.4 Ac)



Reach 3R: Bottom Section of East Cap Ditch

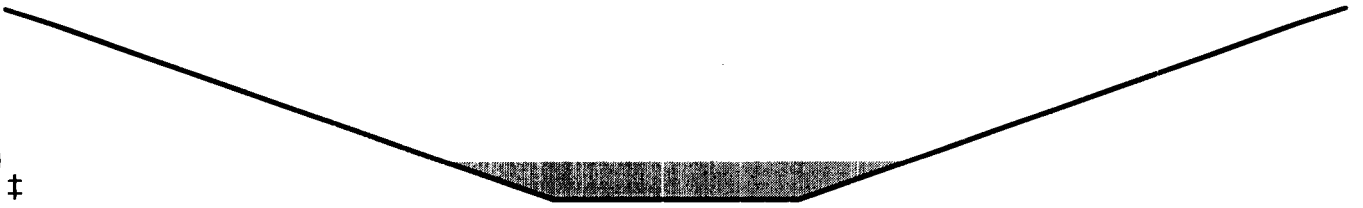
[61] Hint: Submerged 61% of Reach 4R bottom

Inflow Area = 5.043 ac, Inflow Depth > 2.94"
Inflow = 12.84 cfs @ 12.27 hrs, Volume= 1.237 af
Outflow = 12.82 cfs @ 12.29 hrs, Volume= 1.235 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.63 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 3.1 min

Peak Storage= 848 cf @ 12.29 hrs, Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 342.21 cfs

4.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 240.0' Slope= 0.0083 '/'
Inlet Invert= 710.00', Outlet Invert= 708.00'



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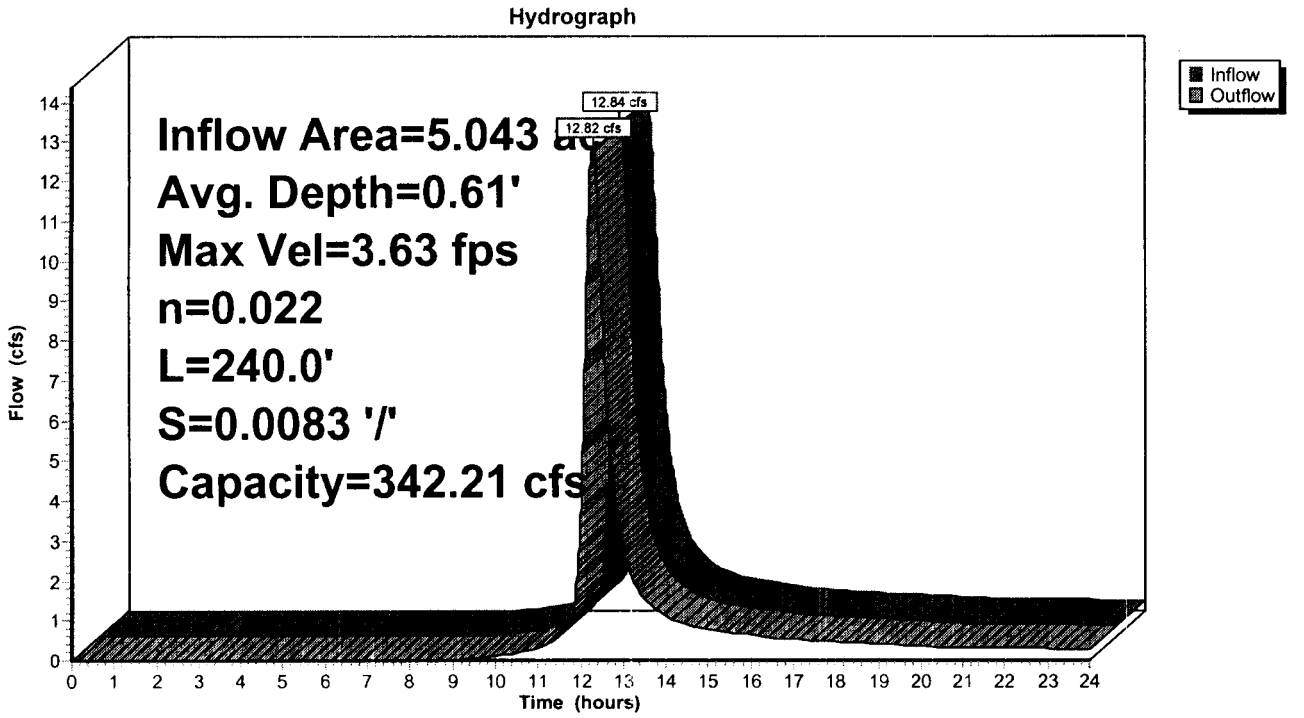
Reach 3R: Bottom Section of East Cap Ditch



Reach 4R: East Cap Ditch

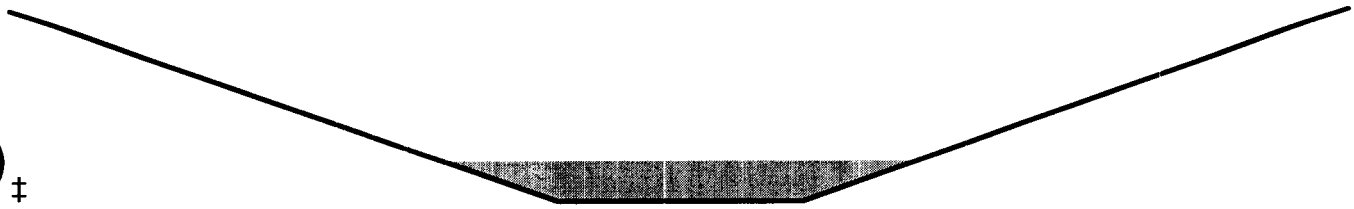
[61] Hint: Submerged 64% of Reach 5R bottom

Inflow Area = 4.243 ac, Inflow Depth > 2.95"
Inflow = 10.93 cfs @ 12.26 hrs, Volume= 1.041 af
Outflow = 10.91 cfs @ 12.27 hrs, Volume= 1.040 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.89 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 3.3 min

Peak Storage= 756 cf @ 12.27 hrs, Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 265.07 cfs

4.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 711.00', Outlet Invert= 710.00'



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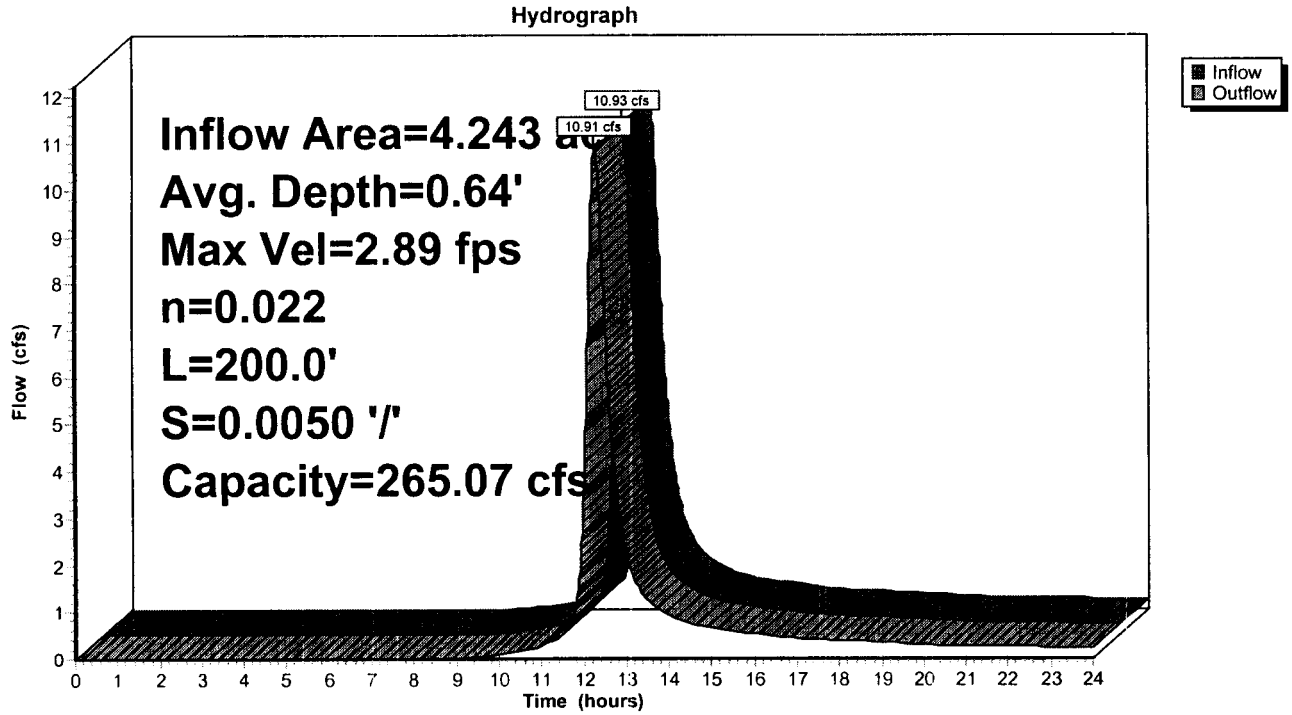
Reach 4R: East Cap Ditch



Reach 5R: Slag Cap Ditch - East

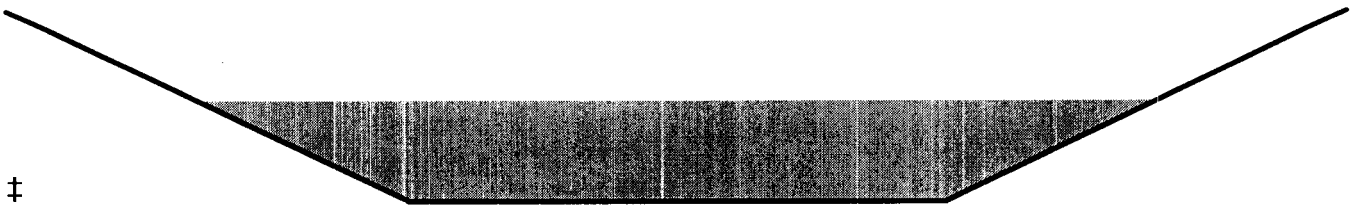
[61] Hint: Submerged 53% of Reach 6R bottom

Inflow Area =	2.843 ac,	Inflow Depth >	2.95"
Inflow =	7.67 cfs @	12.23 hrs, Volume=	0.698 af
Outflow =	7.65 cfs @	12.24 hrs, Volume=	0.697 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.60 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 3.9 min

Peak Storage= 589 cf @ 12.24 hrs, Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 25.80 cfs

4.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 712.00', Outlet Invert= 711.00'



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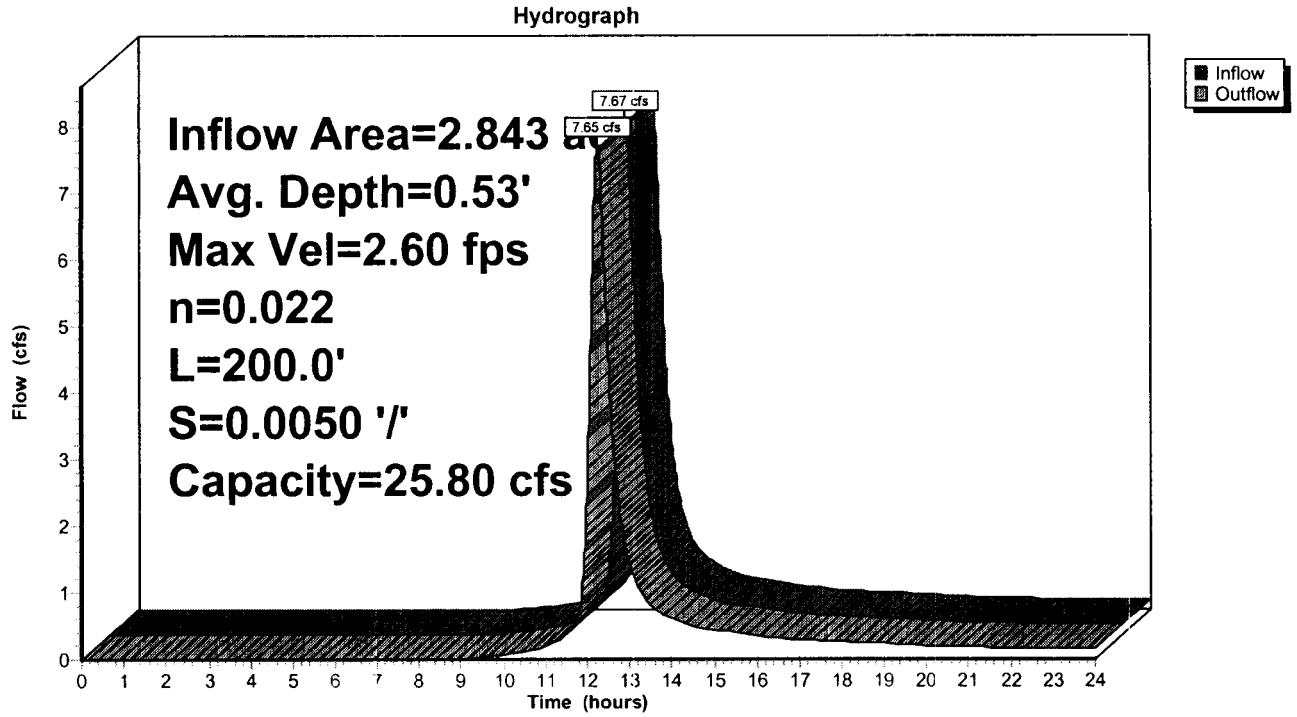
Reach 5R: Slag Cap Ditch - East



Reach 6R: Slag Cap East Ditch

[61] Hint: Submerged 53% of Reach 7R bottom

Inflow Area = 1.813 ac, Inflow Depth > 2.95"
Inflow = 5.16 cfs @ 12.20 hrs, Volume= 0.446 af
Outflow = 5.13 cfs @ 12.22 hrs, Volume= 0.445 af, Atten= 1%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.30 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 4.5 min

Peak Storage= 446 cf @ 12.22 hrs, Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 25.80 cfs

4.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 713.00', Outlet Invert= 712.00'

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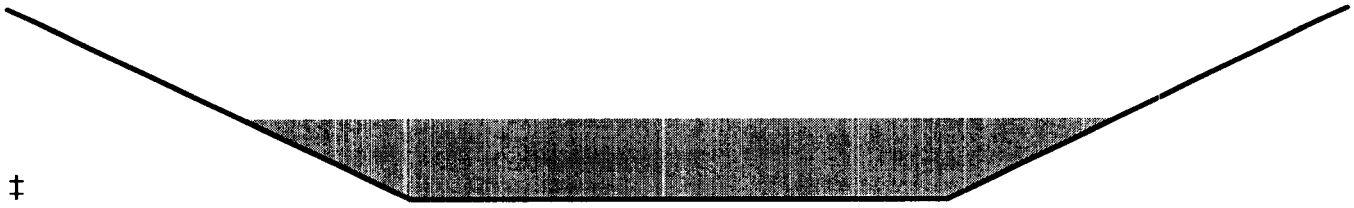
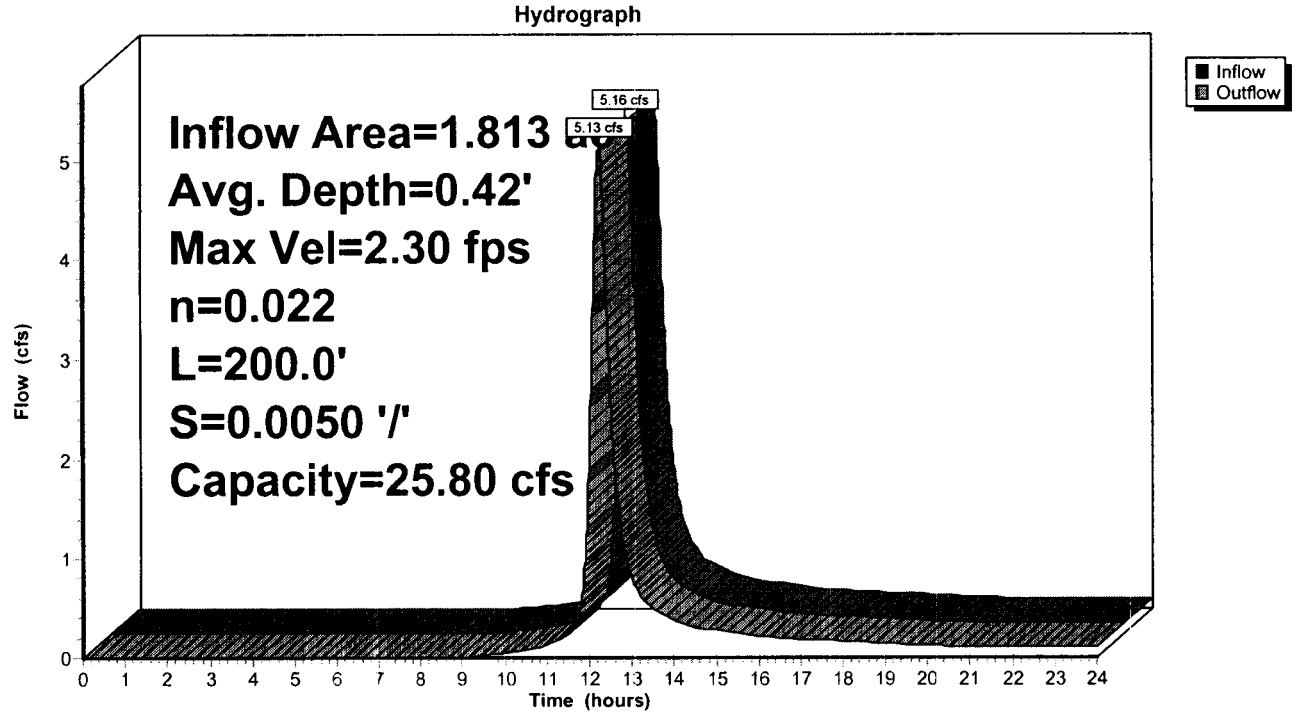


Reach 6R: Slag Cap East Ditch



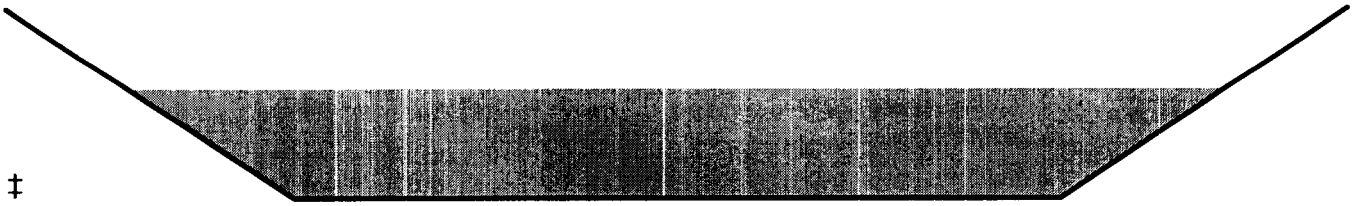
Reach 7R: Slag Cap East Ditch - Apex

Inflow Area = 0.900 ac, Inflow Depth > 2.96"
Inflow = 2.57 cfs @ 12.20 hrs, Volume= 0.222 af
Outflow = 2.55 cfs @ 12.21 hrs, Volume= 0.221 af, Atten= 1%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.84 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 4.7 min

Peak Storage= 222 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 6.94 cfs

4.00' x 0.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 713.80', Outlet Invert= 713.00'



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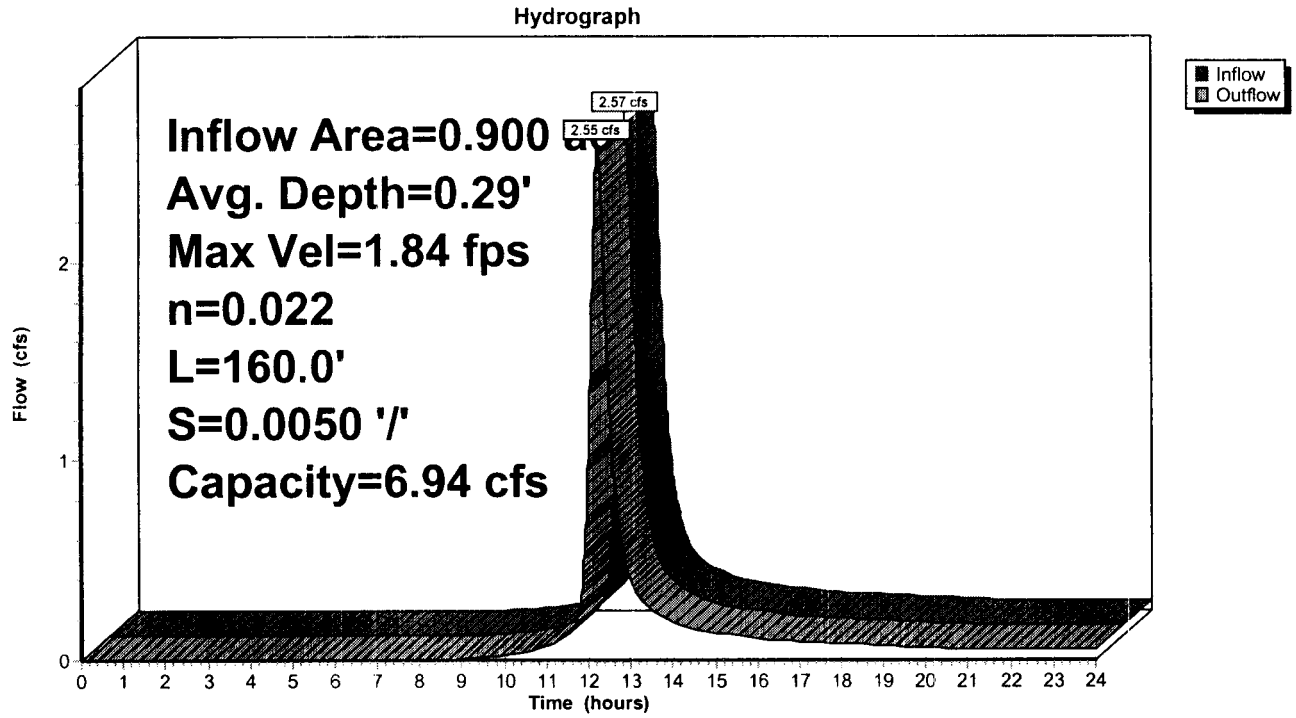
Reach 7R: Slag Cap East Ditch - Apex



Reach 9R: Slag Cap Drainage Ditch West

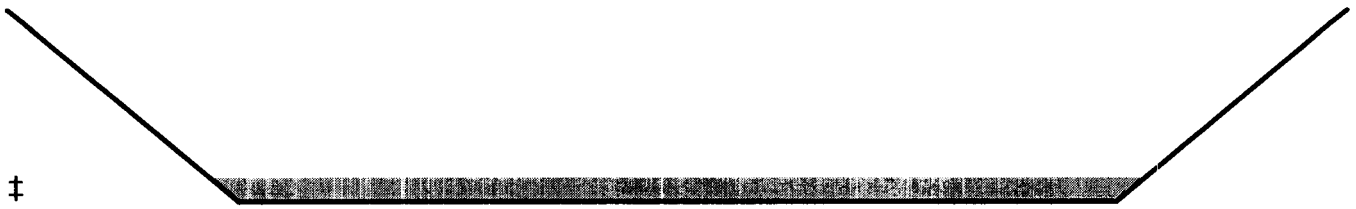
[61] Hint: Submerged 87% of Reach 10R bottom

Inflow Area = 16.750 ac, Inflow Depth > 3.15"
Inflow = 51.25 cfs @ 12.12 hrs, Volume= 4.403 af
Outflow = 51.21 cfs @ 12.12 hrs, Volume= 4.400 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.84 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 2.0 min

Peak Storage= 1,625 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 3.50', Capacity at Bank-Full= 1,786.48 cfs

40.00' x 3.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 61.00'
Length= 90.0' Slope= 0.0056 '/'
Inlet Invert= 709.50', Outlet Invert= 709.00'



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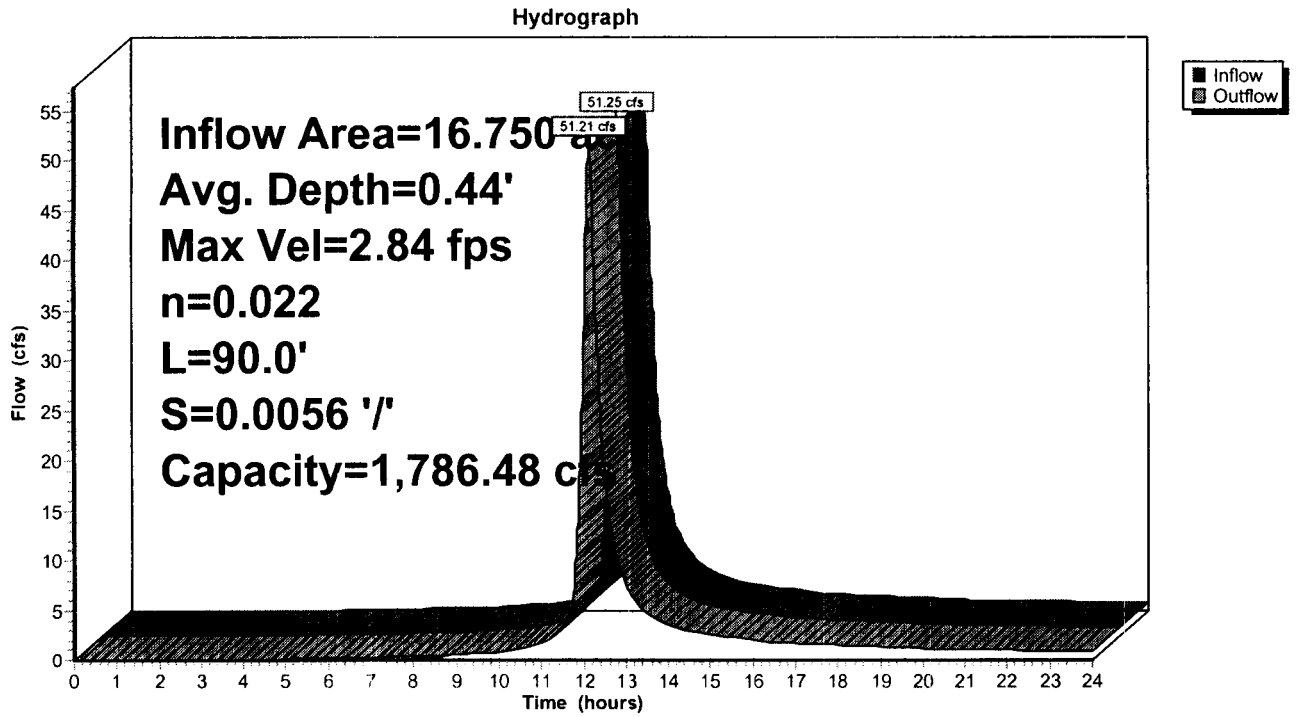
Reach 9R: Slag Cap Drainage Ditch West



Reach 10R: Slag Cap Ditch West

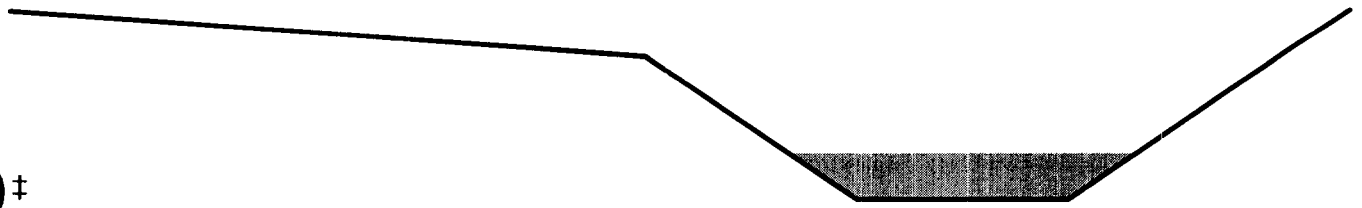
[61] Hint: Submerged 98% of Reach 11R bottom

Inflow Area = 15.600 ac, Inflow Depth > 3.18"
Inflow = 49.16 cfs @ 12.11 hrs, Volume= 4.132 af
Outflow = 49.14 cfs @ 12.11 hrs, Volume= 4.130 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.22 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 1.3 min

Peak Storage= 1,048 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 675.08 cfs

Custom cross-section, Length= 90.0' Slope= 0.0056 '/'
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 710.00', Outlet Invert= 709.50'



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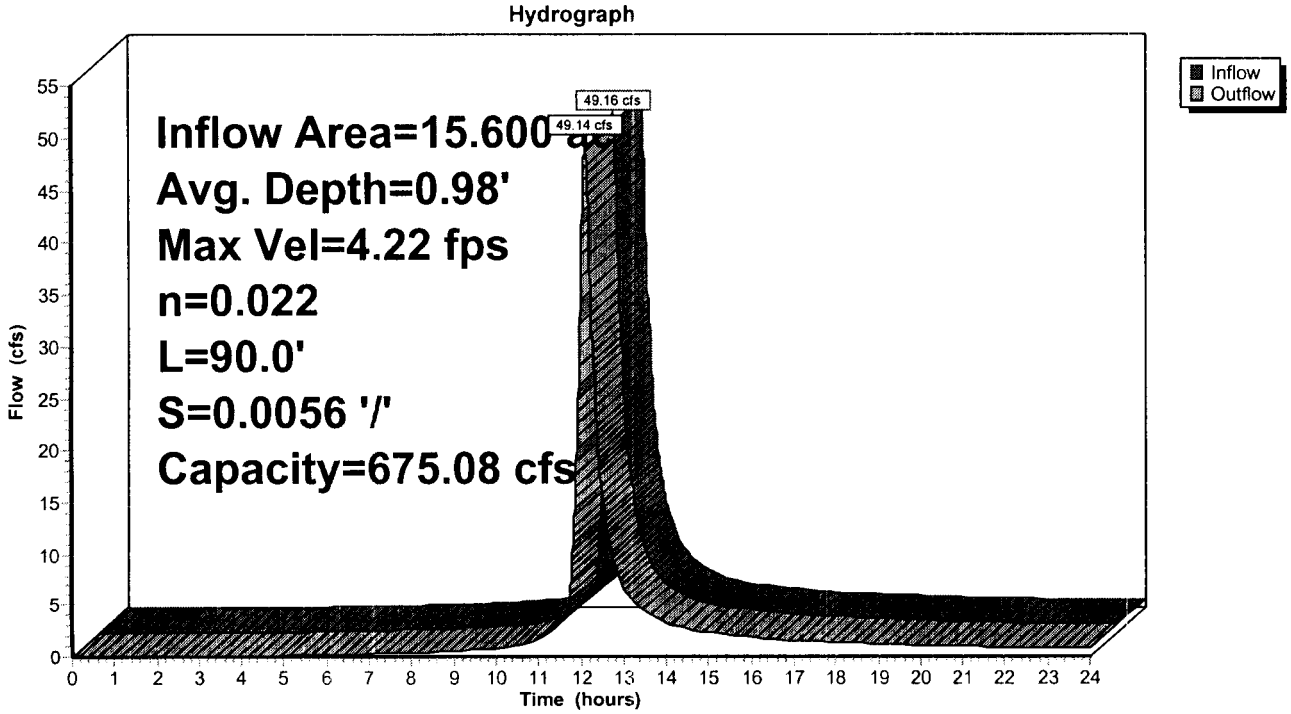
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	4.00	0.00
27.00	3.00	1.00
36.00	0.00	4.00
45.00	0.00	4.00
57.00	4.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	9.0	0	0.00
3.00	54.0	28.0	4,860	421.49
4.00	96.0	58.2	8,640	675.08

Reach 10R: Slag Cap Ditch West



Reach 11R: Slag Cap Ditch West

[61] Hint: Submerged 95% of Reach 12R bottom

Inflow Area = 14.710 ac, Inflow Depth > 3.22"
Inflow = 47.09 cfs @ 12.10 hrs, Volume= 3.949 af
Outflow = 46.99 cfs @ 12.11 hrs, Volume= 3.945 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.16 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 2.6 min

Peak Storage= 2,032 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.95'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 390.36 cfs

Custom cross-section, Length= 180.0' Slope= 0.0056 '/' (101 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 711.00', Outlet Invert= 710.00'

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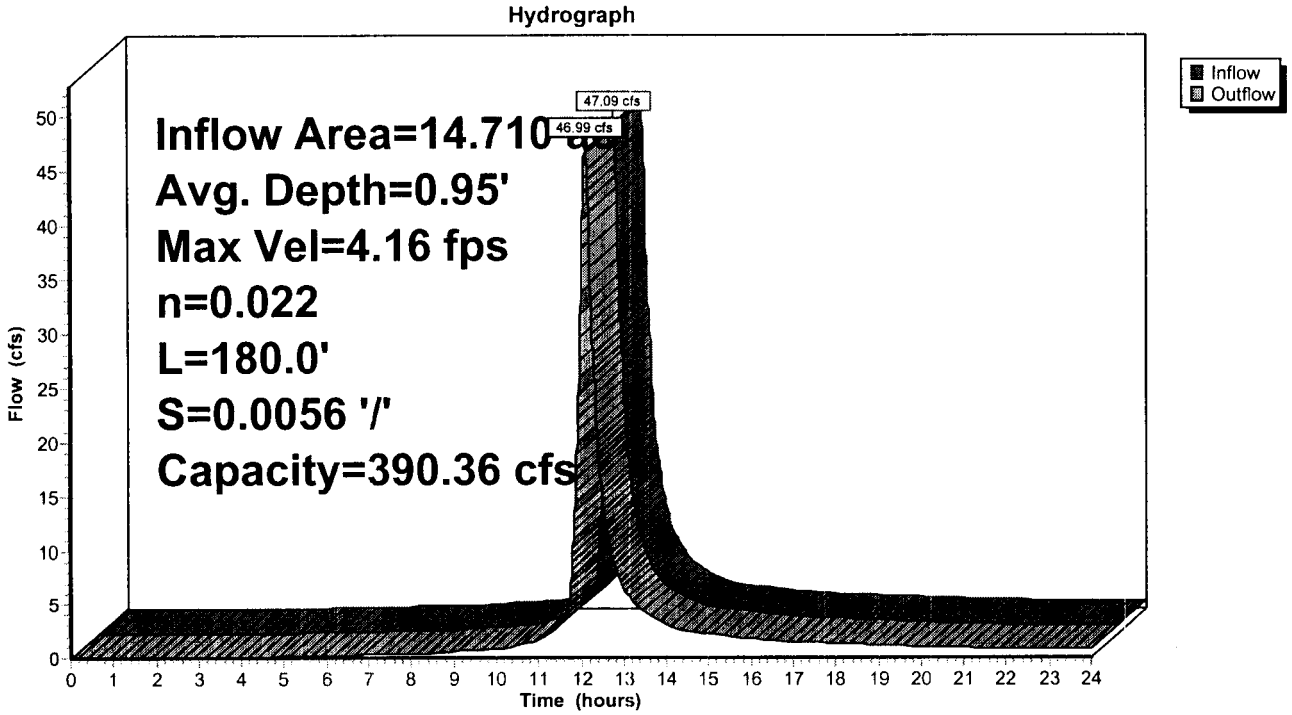
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	3.00	0.00
30.00	2.00	1.00
36.00	0.00	3.00
45.00	0.00	3.00
54.00	3.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	9.0	0	0.00
2.00	30.0	21.6	5,400	187.73
3.00	67.5	54.8	12,150	390.36

Reach 11R: Slag Cap Ditch West



Reach 12R: Slag Cap Ditch West

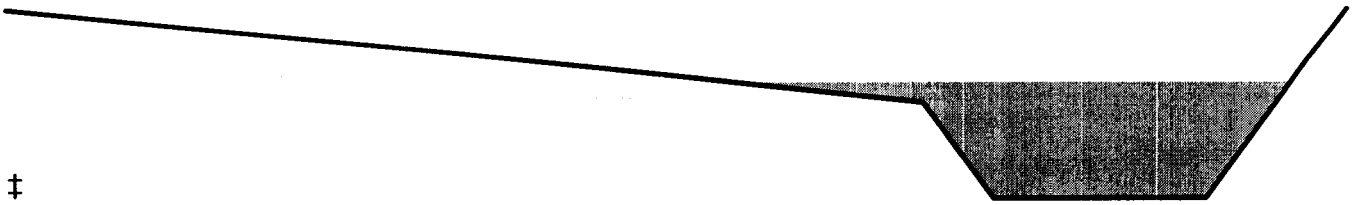
[61] Hint: Submerged 96% of Reach 13R bottom

Inflow Area = 13.090 ac, Inflow Depth > 3.30"
Inflow = 44.52 cfs @ 12.08 hrs, Volume= 3.600 af
Outflow = 43.72 cfs @ 12.10 hrs, Volume= 3.596 af, Atten= 2%, Lag= 1.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 3.6 min

Peak Storage= 3,032 cf @ 12.10 hrs, Average Depth at Peak Storage= 1.20'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.93 cfs

Custom cross-section, Length= 190.0' Slope= 0.0053 '/'
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 712.00', Outlet Invert= 711.00'



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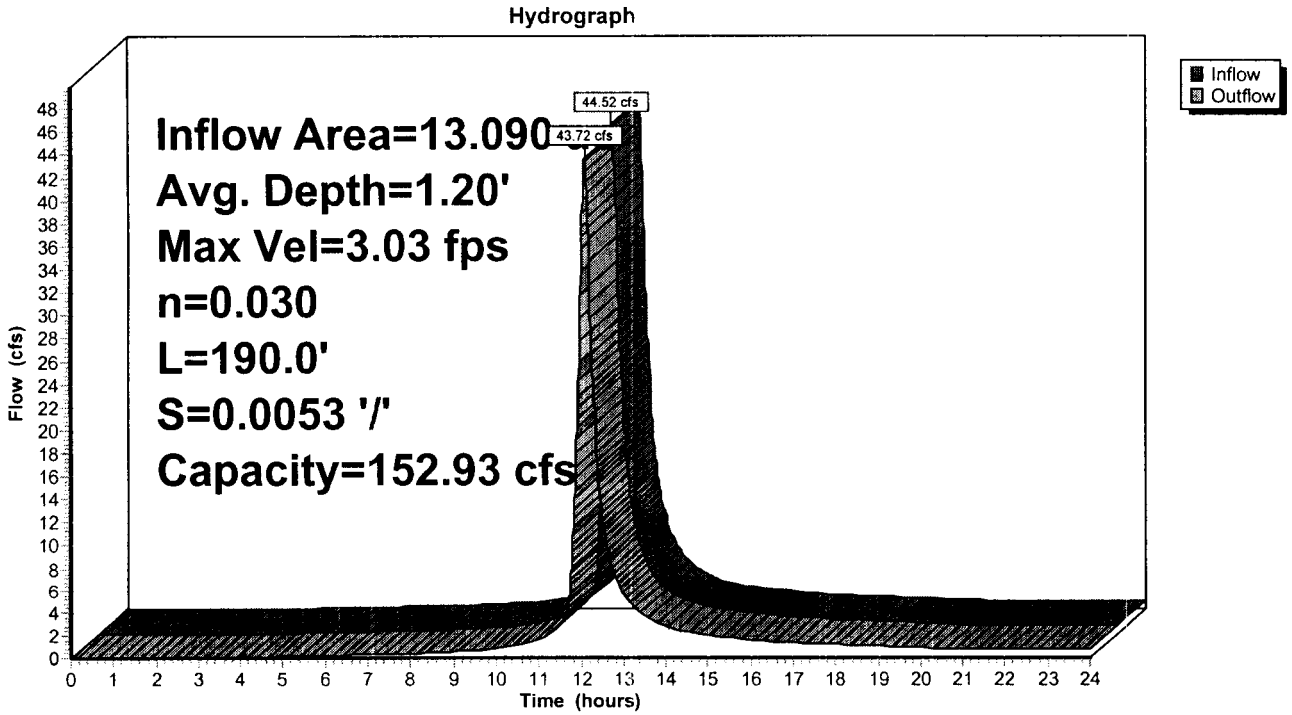
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	2.00	0.00
39.00	1.00	1.00
42.00	0.00	2.00
51.00	0.00	2.00
57.00	2.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	9.0	0	0.00
1.00	12.0	15.3	2,280	36.64
2.00	48.0	57.5	9,120	152.93

Reach 12R: Slag Cap Ditch West



Reach 13R: Slag Cap Ditch West

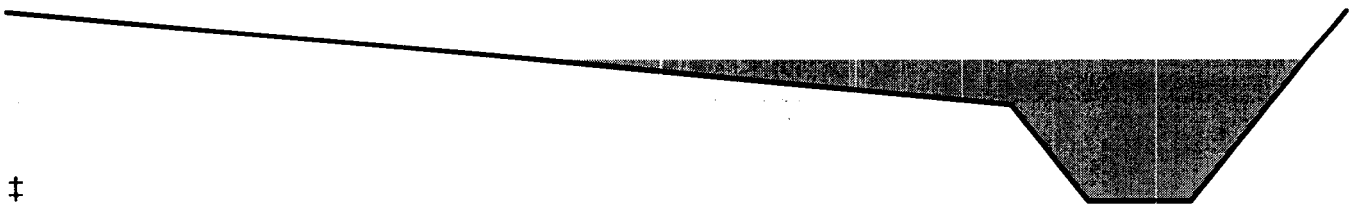
[61] Hint: Submerged 25% of Reach 14R bottom

Inflow Area = 11.400 ac, Inflow Depth > 3.41"
Inflow = 40.62 cfs @ 12.05 hrs, Volume= 3.244 af
Outflow = 39.93 cfs @ 12.07 hrs, Volume= 3.240 af, Atten= 2%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.82 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 3.5 min

Peak Storage= 3,663 cf @ 12.07 hrs, Average Depth at Peak Storage= 1.47'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 113.10 cfs

Custom cross-section, Length= 225.0' Slope= 0.0056 '/'
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 713.25', Outlet Invert= 712.00'



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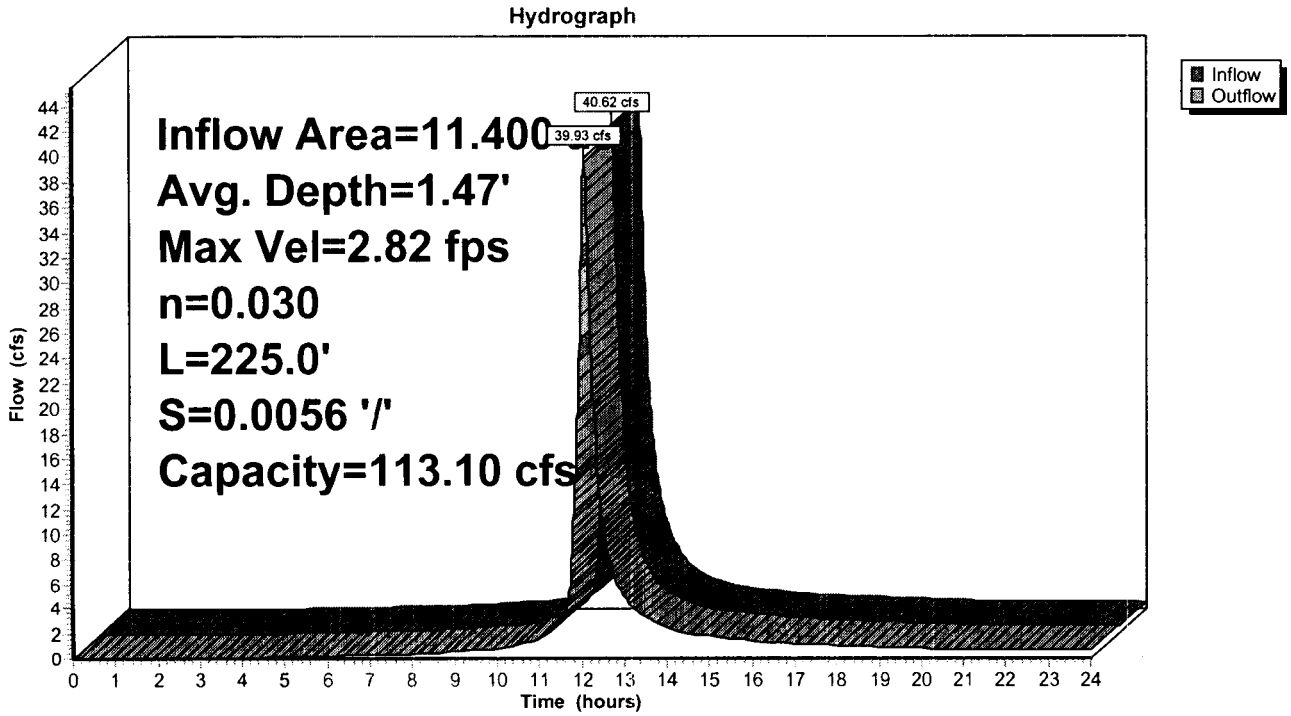
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	2.00	0.00
39.00	1.00	1.00
42.00	0.00	2.00
46.00	0.00	2.00
52.00	2.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	4.0	0	0.00
1.00	7.0	10.3	1,575	19.95
2.00	38.0	52.5	8,550	113.10

Reach 13R: Slag Cap Ditch West



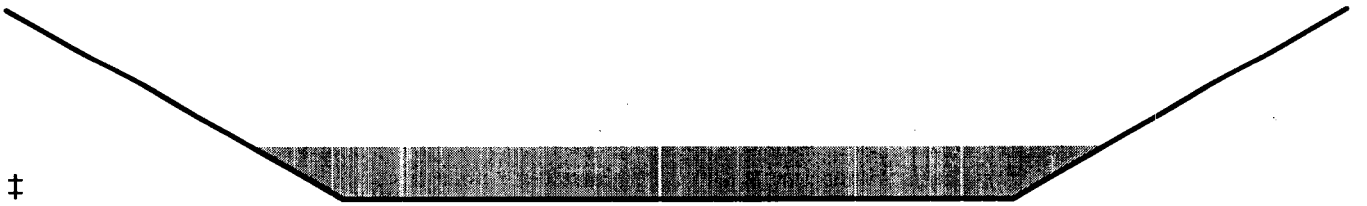
Reach 14R: Discharge ditch from P.H., portion of Coal Yard, and Chem Pond Area

Inflow Area = 9.910 ac, Inflow Depth > 3.54"
Inflow = 37.68 cfs @ 12.04 hrs, Volume= 2.927 af
Outflow = 37.68 cfs @ 12.04 hrs, Volume= 2.926 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.49 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.91 fps, Avg. Travel Time= 1.0 min

Peak Storage= 578 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 369.91 cfs

8.00' x 2.00' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 115.0' Slope= 0.0609 '/'
Inlet Invert= 720.00', Outlet Invert= 713.00'



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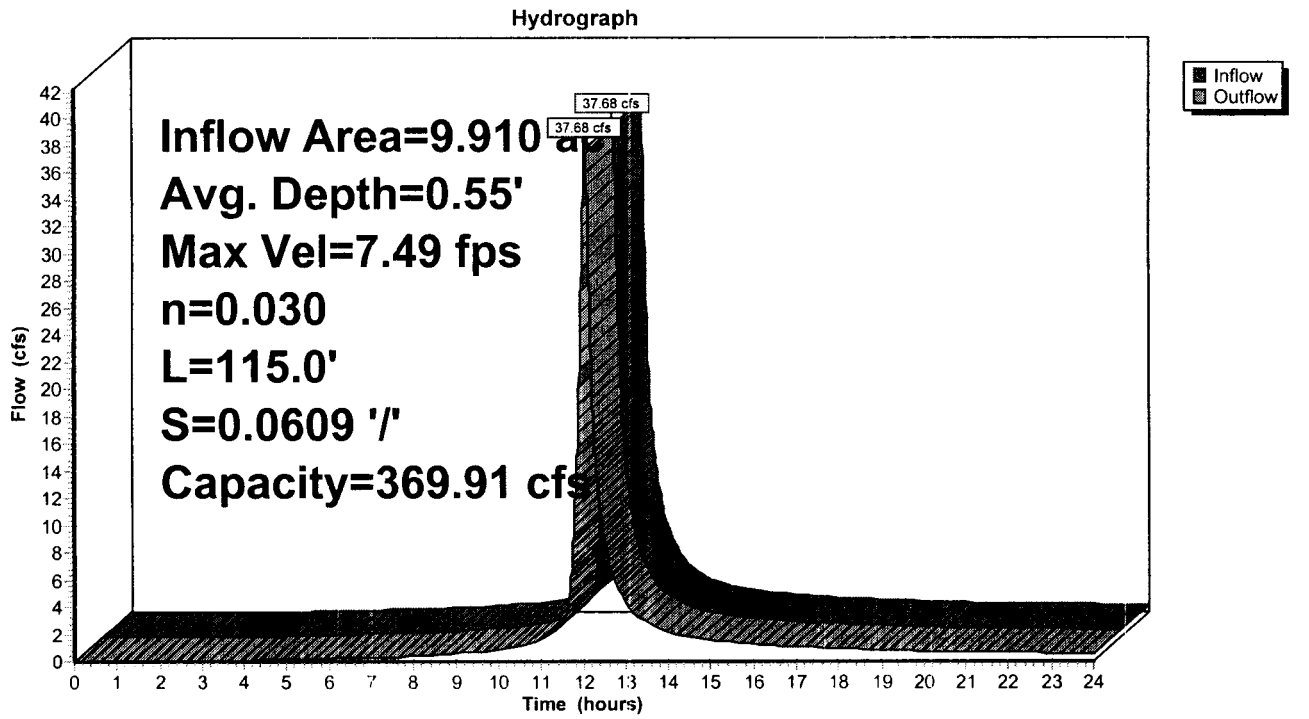
Reach 14R: Discharge ditch from P.H., portion of Coal Yard, and Chem Pond Area



Pond 2P: Swamp SW of Slag Area (5.285 Ac)

Inflow Area = 148.553 ac, Inflow Depth > 2.74"
Inflow = 161.07 cfs @ 12.19 hrs, Volume= 33.886 af
Outflow = 146.97 cfs @ 12.29 hrs, Volume= 33.886 af, Atten= 9%, Lag= 6.1 min
Primary = 146.97 cfs @ 12.29 hrs, Volume= 33.886 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 707.90' @ 12.29 hrs Surf.Area= 0.805 ac Storage= 0.670 af
Flood Elev= 710.00' Surf.Area= 5.910 ac Storage= 7.291 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.1 min (876.0 - 874.9)

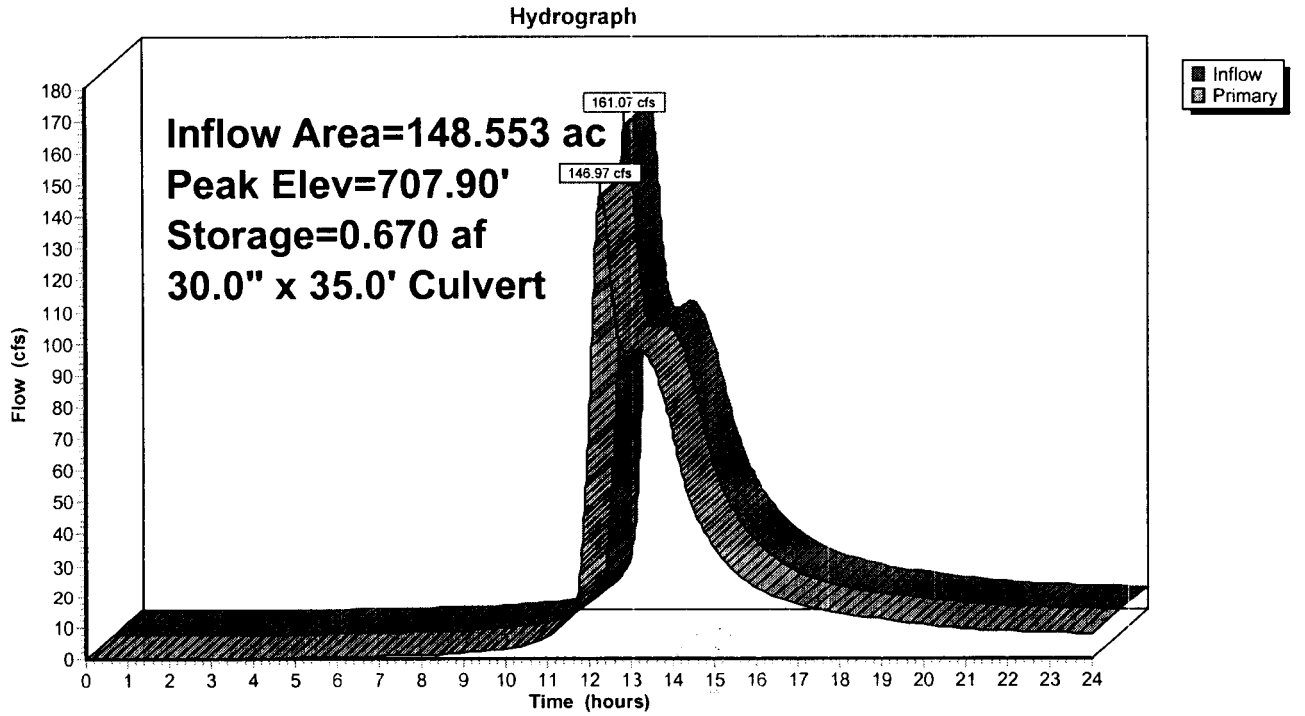
Volume	Invert	Avail.Storage	Storage Description
#1	706.40'	7.291 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
706.40	0.000	0.0	0.000	0.000	0.000
707.00	0.482	615.0	0.096	0.096	0.691
708.00	0.846	1,550.0	0.656	0.752	4.389
709.00	3.360	3,076.0	1.964	2.716	17.285
710.00	5.910	4,162.0	4.575	7.291	31.646

Device	Routing	Invert	Outlet Devices
#1	Primary	705.30'	**30.0" x 35.0' long Culvert X 6.00** RCP, groove end projecting, Ke= 0.200 Outlet Invert= 705.15' S= 0.0043 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=146.96 cfs @ 12.29 hrs HW=707.90' TW=705.48' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 146.96 cfs @ 5.96 fps)

Pond 2P: Swamp SW of Slag Area (5.285 Ac)



Pond 3P: Fly Ash Pond

Inflow Area = 148.553 ac, Inflow Depth > 2.74"
Inflow = 146.97 cfs @ 12.29 hrs, Volume= 33.886 af
Outflow = 93.22 cfs @ 13.52 hrs, Volume= 32.442 af, Atten= 37%, Lag= 73.6 min
Primary = 93.22 cfs @ 13.52 hrs, Volume= 32.442 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 705.80' @ 13.52 hrs Surf.Area= 8.035 ac Storage= 6.734 af

Plug-Flow detention time= 71.0 min calculated for 32.442 af (96% of inflow)
Center-of-Mass det. time= 48.8 min (924.8 - 876.0)

Volume	Invert	Avail.Storage	Storage Description
#1	704.92'	48.768 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

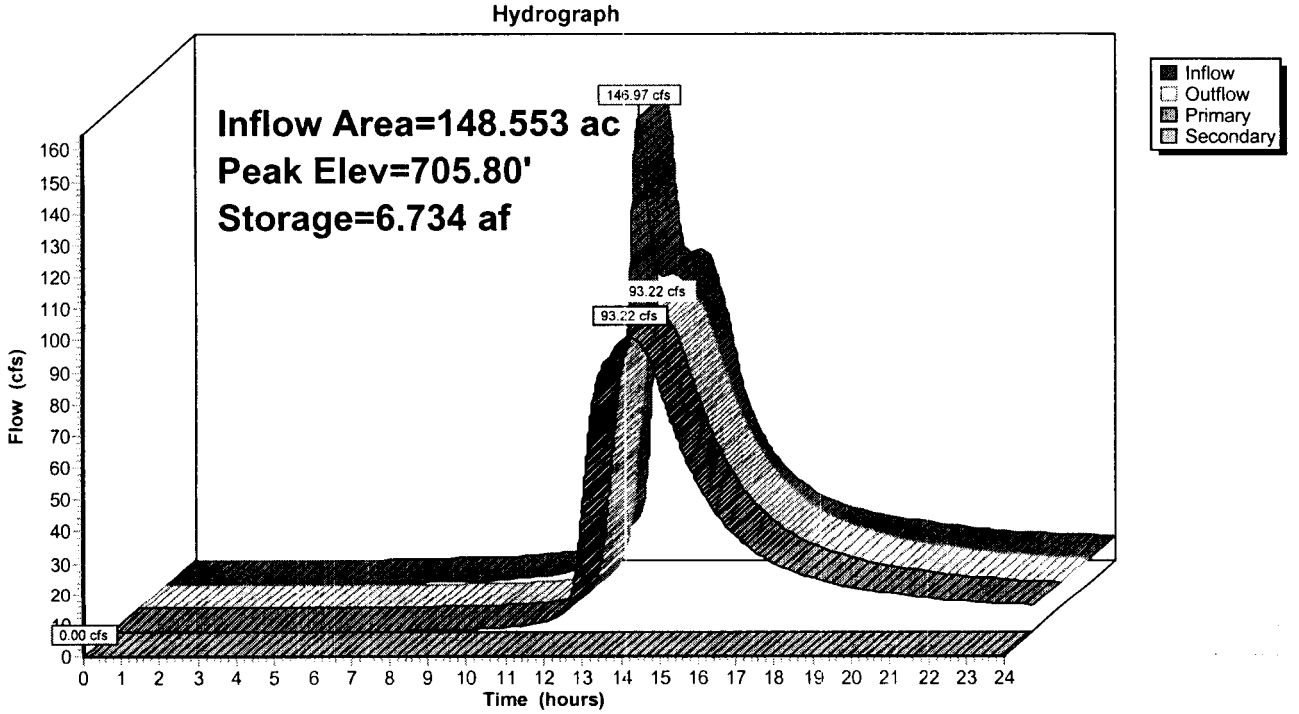
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
704.92	7.200	0.000	0.000
710.00	12.000	48.768	48.768

Device	Routing	Invert	Outlet Devices
#1	Primary	704.92'	**14.1' long Sharp-Crested Rectangular Weir X 2.00** 0 End Contraction(s) 0.5' Crest Height
#2	Secondary	705.82'	**14.1' long Sharp-Crested Rectangular Weir X 2.00** 0 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=93.22 cfs @ 13.52 hrs HW=705.80' TW=692.22' (Dynamic Tailwater)
↑—**1=Sharp-Crested Rectangular Weir**(Weir Controls 93.22 cfs @ 3.74 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=704.92' TW=688.00' (Dynamic Tailwater)
↑—**2=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 3P: Fly Ash Pond



Pond 4P: Culverts discharging from Spillway Structures - FLY ASH POnd

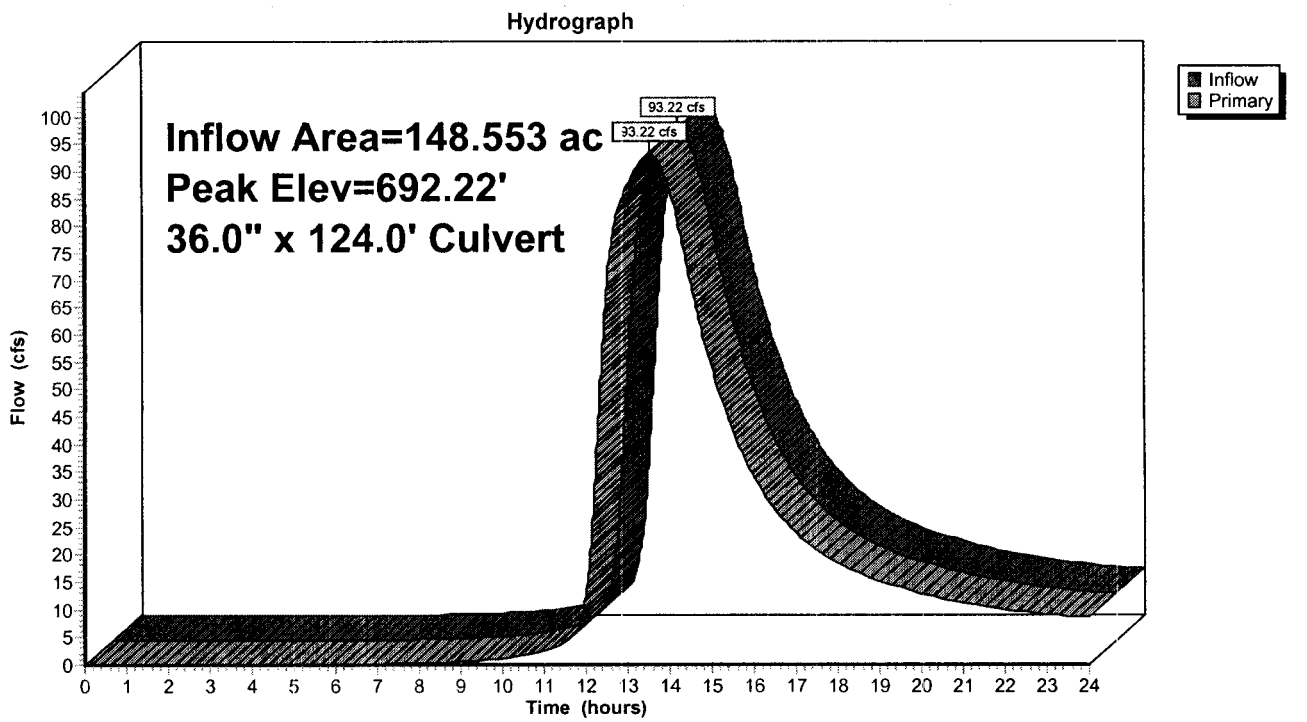
Inflow Area = 148.553 ac, Inflow Depth > 2.62"
Inflow = 93.22 cfs @ 13.52 hrs, Volume= 32.442 af
Outflow = 93.22 cfs @ 13.52 hrs, Volume= 32.442 af, Atten= 0%, Lag= 0.0 min
Primary = 93.22 cfs @ 13.52 hrs, Volume= 32.442 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 692.22' @ 13.52 hrs
Flood Elev= 705.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	688.00'	**36.0" x 124.0' long Culvert X 2.00** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 687.40' S= 0.0048 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets

Primary OutFlow Max=93.22 cfs @ 13.52 hrs HW=692.22' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 93.22 cfs @ 6.59 fps)

Pond 4P: Culverts discharging from Spillway Structures - FLY ASH POnd



Pond 5P: Culverts discharging from Spillwat Structures - Fly Ash Pond

[57] Hint: Peaked at 688.00' (Flood elevation advised)

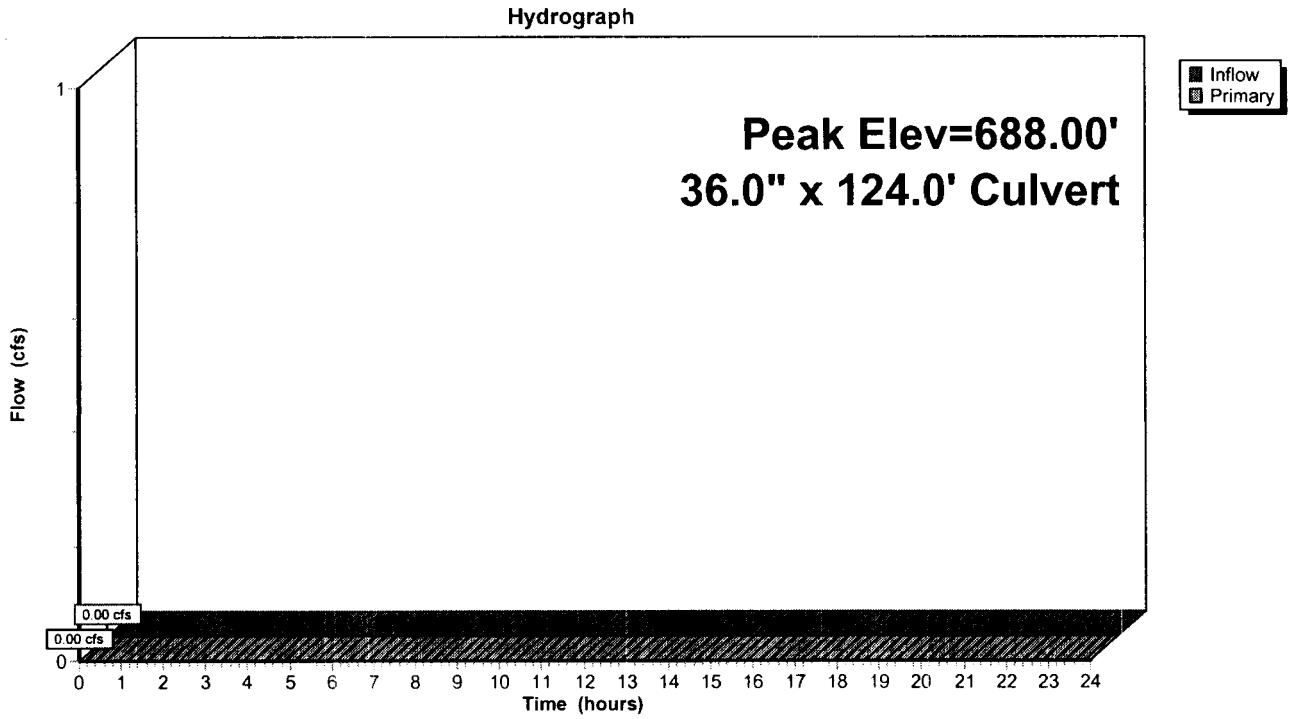
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 688.00' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	688.00'	**36.0" x 124.0' long Culvert X 2.00** RCP, groove end projecting, Ke= 0.200 Outlet Invert= 687.40' S= 0.0048 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=688.00' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 5P: Culverts discharging from Spillwat Structures - Fly Ash Pond



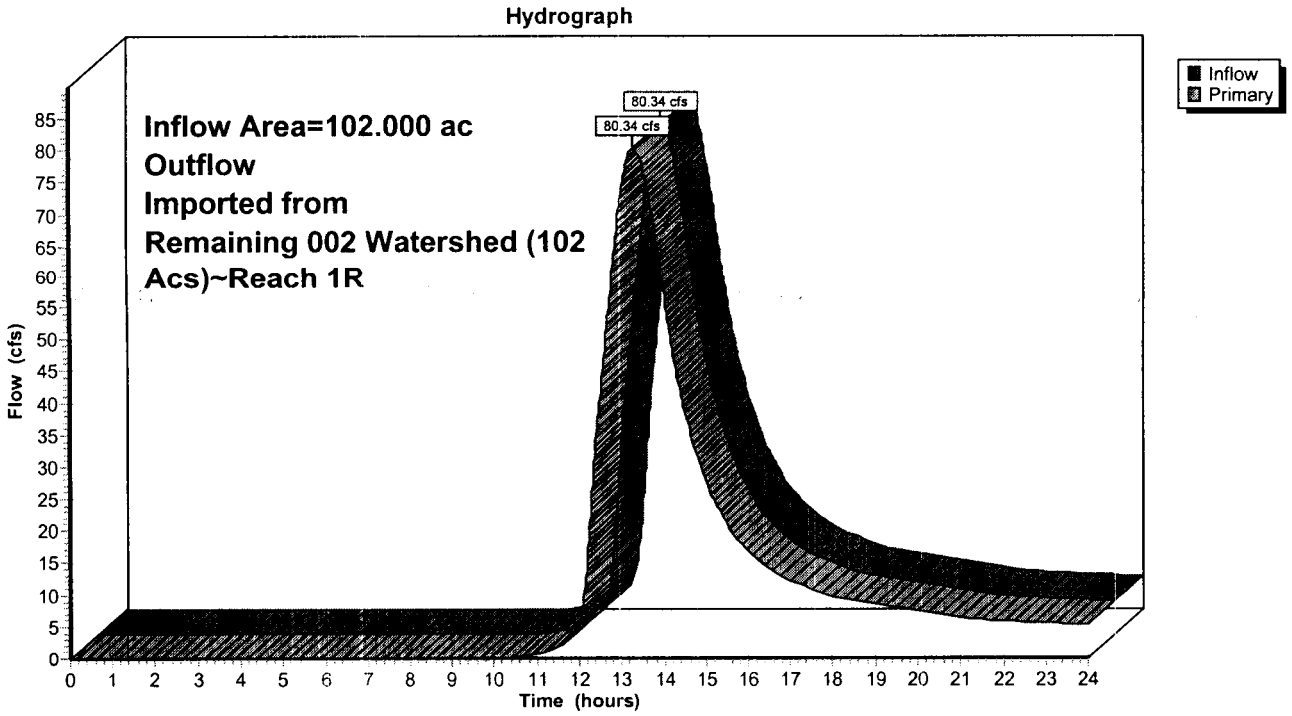
Link 1L: Remaining 002 Watershed (102 Acs)

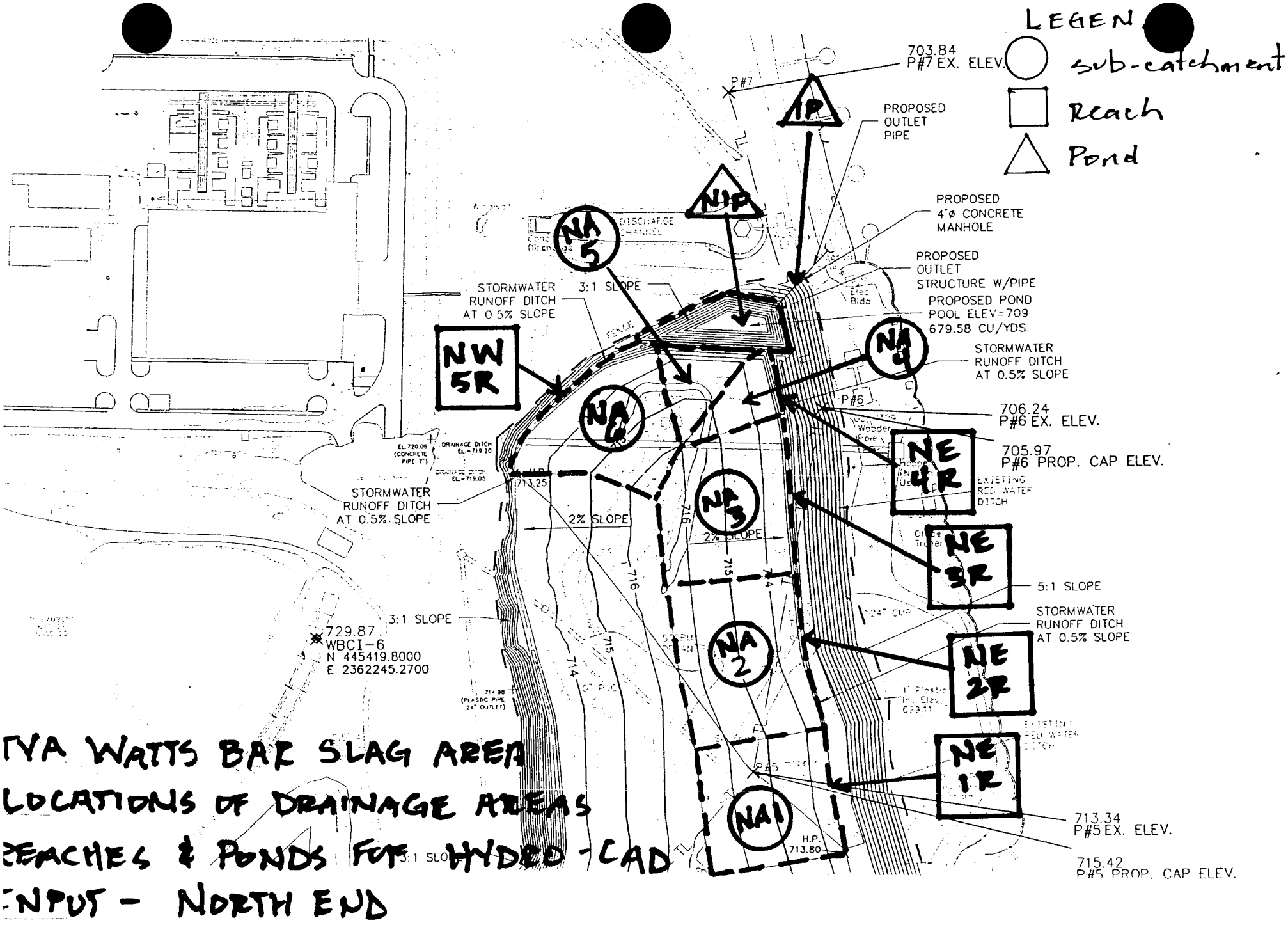
Inflow Area = 102.000 ac, Inflow Depth > 2.36"
Inflow = 80.34 cfs @ 13.26 hrs, Volume= 20.088 af
Primary = 80.34 cfs @ 13.26 hrs, Volume= 20.088 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Outflow Imported from Remaining 002 Watershed (102 Acs)~Reach 1R

Link 1L: Remaining 002 Watershed (102 Acs)



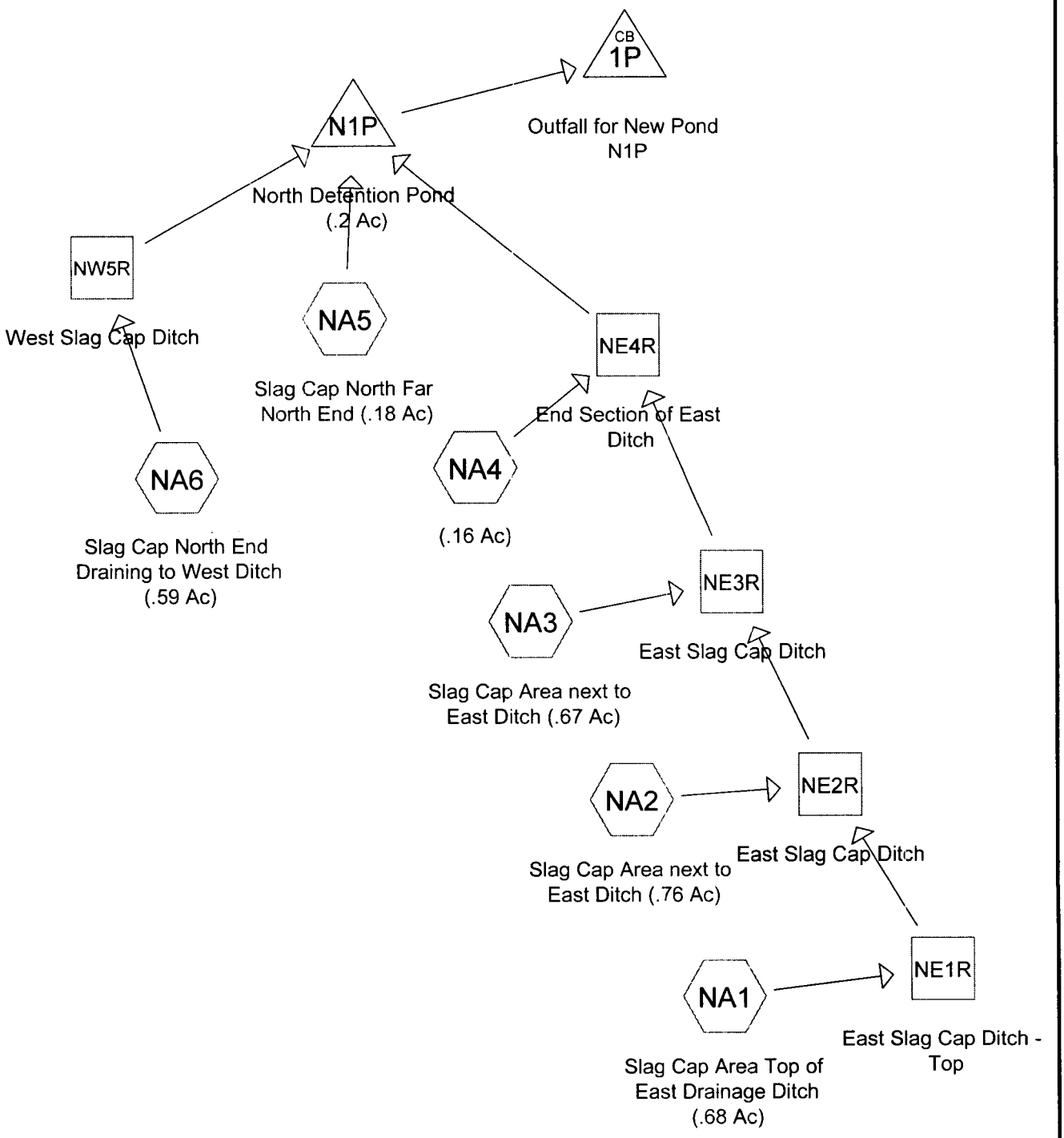


TVA WATTS BAR SLAG AREA

LOCATIONS OF DRAINAGE AREAS

REACHES & PONDS FOR HYDRO-CAD

INPUT - NORTH END



Subcat Reach Pond Link

Drainage Diagram for Mar 10 2008 Redesign 25 yr Event Slag Cap North Retention Pond (3.24 Ac)

Prepared by {enter your company name here} 06/15/2009

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
3.040	74	>75% Grass cover, Good, HSG C (NA1,NA2,NA3,NA4,NA5,NA6)
3.040		

Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment NA1: Slag Cap Area Top of East Drainage Ditch Runoff Area=0.680 ac Runoff Depth>2.95"
Flow Length=254' Slope=0.0200 '/' Tc=28.8 min CN=74 Runoff=1.79 cfs 0.167 af

Subcatchment NA2: Slag Cap Area next to East Ditch (.76 Ac) Runoff Area=0.760 ac Runoff Depth>2.95"
Flow Length=254' Slope=0.0200 '/' Tc=28.8 min CN=74 Runoff=2.00 cfs 0.187 af

Subcatchment NA3: Slag Cap Area next to East Ditch (.67 Ac) Runoff Area=0.670 ac Runoff Depth>2.95"
Flow Length=263' Slope=0.0200 '/' Tc=29.6 min CN=74 Runoff=1.73 cfs 0.165 af

Subcatchment NA4: (.16 Ac) Runoff Area=0.160 ac Runoff Depth>2.96"
Flow Length=159' Slope=0.0200 '/' Tc=19.8 min CN=74 Runoff=0.53 cfs 0.039 af

Subcatchment NA5: Slag Cap North Far North End (.18 Ac) Runoff Area=0.180 ac Runoff Depth>2.96"
Flow Length=150' Slope=0.0330 '/' Tc=15.4 min CN=74 Runoff=0.68 cfs 0.044 af

Subcatchment NA6: Slag Cap North End Draining to West Dit Runoff Area=0.590 ac Runoff Depth>2.96"
Flow Length=200' Slope=0.0200 '/' Tc=23.8 min CN=74 Runoff=1.75 cfs 0.145 af

Reach NE1R: East Slag Cap Ditch - Top Avg. Depth=0.28' Max Vel=1.33 fps Inflow=1.79 cfs 0.167 af
n=0.030 L=160.0' S=0.0050 '/' Capacity=12.26 cfs Outflow=1.77 cfs 0.167 af

Reach NE2R: East Slag Cap Ditch Avg. Depth=0.42' Max Vel=1.68 fps Inflow=3.73 cfs 0.354 af
n=0.030 L=200.0' S=0.0050 '/' Capacity=18.92 cfs Outflow=3.68 cfs 0.353 af

Reach NE3R: East Slag Cap Ditch Avg. Depth=0.51' Max Vel=1.87 fps Inflow=5.34 cfs 0.518 af
n=0.030 L=200.0' S=0.0050 '/' Capacity=18.92 cfs Outflow=5.28 cfs 0.516 af

Reach NE4R: End Section of East Ditch Avg. Depth=0.40' Max Vel=2.66 fps Inflow=5.53 cfs 0.556 af
n=0.030 L=75.0' S=0.0133 '/' Capacity=129.27 cfs Outflow=5.51 cfs 0.555 af

Reach NW5R: West Slag Cap Ditch Avg. Depth=0.25' Max Vel=1.42 fps Inflow=1.75 cfs 0.145 af
n=0.035 L=262.0' S=0.0086 '/' Capacity=88.92 cfs Outflow=1.71 cfs 0.145 af

Pond 1P: Outfall for New Pond N1P Peak Elev=706.40' Inflow=0.96 cfs 0.360 af
24.0" x 110.0' Culvert Outflow=0.96 cfs 0.360 af

Pond N1P: North Detention Pond (.2 Ac) Peak Elev=708.87' Storage=0.432 af Inflow=7.30 cfs 0.745 af
Primary=0.96 cfs 0.360 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.360 af

Total Runoff Area = 3.040 ac Runoff Volume = 0.749 af Average Runoff Depth = 2.96"
100.00% Pervious Area = 3.040 ac 0.00% Impervious Area = 0.000 ac

Subcatchment NA1: Slag Cap Area Top of East Drainage Ditch (.68 Ac)

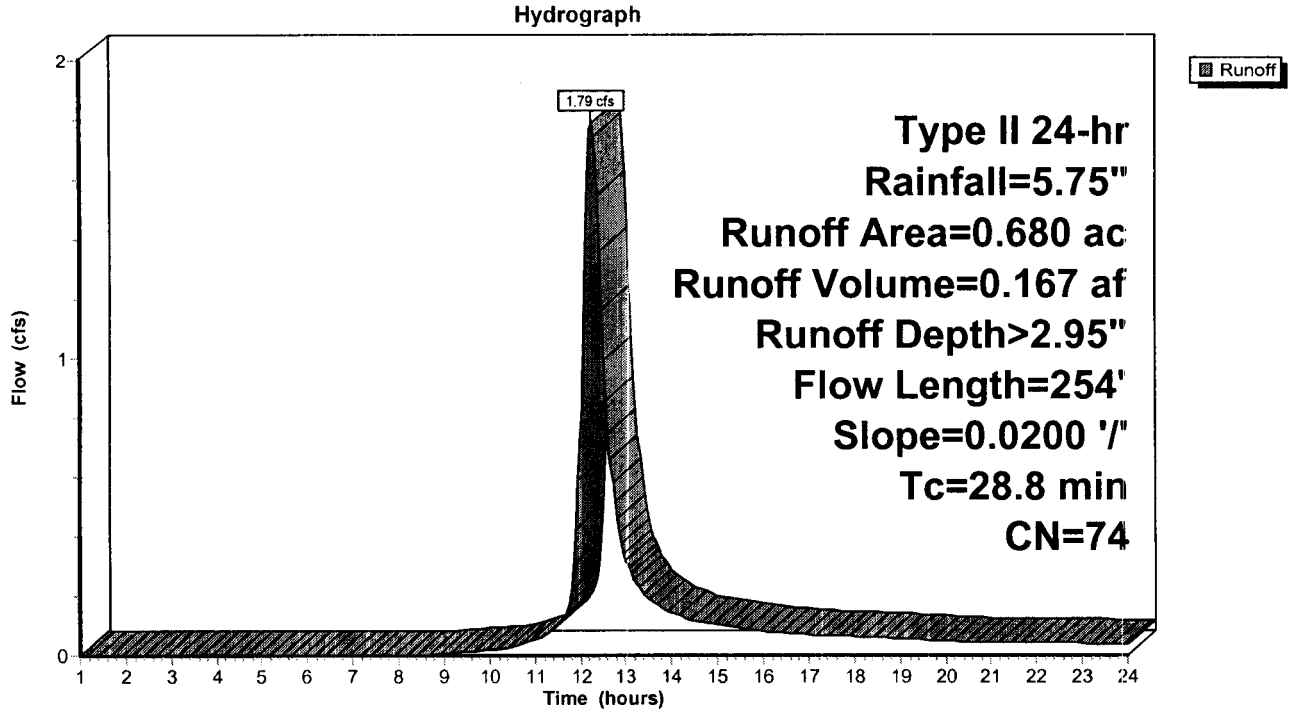
Runoff = 1.79 cfs @ 12.23 hrs, Volume= 0.167 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.680	74	>75% Grass cover, Good, HSG C
0.680		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	254	0.0200	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment NA1: Slag Cap Area Top of East Drainage Ditch (.68 Ac)



Subcatchment NA2: Slag Cap Area next to East Ditch (.76 Ac)

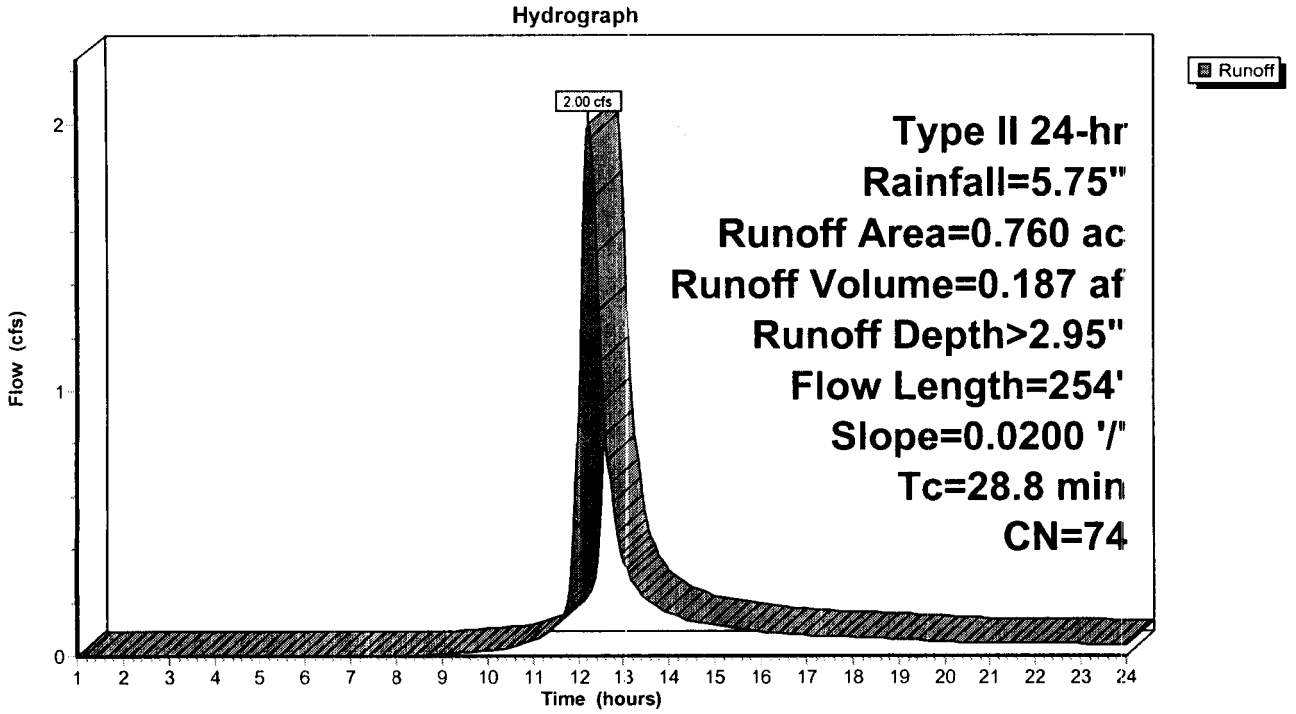
Runoff = 2.00 cfs @ 12.23 hrs, Volume= 0.187 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.760	74	>75% Grass cover, Good, HSG C
0.760		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	254	0.0200	0.15		**Sheet Flow, Slag Cap portion next to NA1** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment NA2: Slag Cap Area next to East Ditch (.76 Ac)



Subcatchment NA3: Slag Cap Area next to East Ditch (.67 Ac)

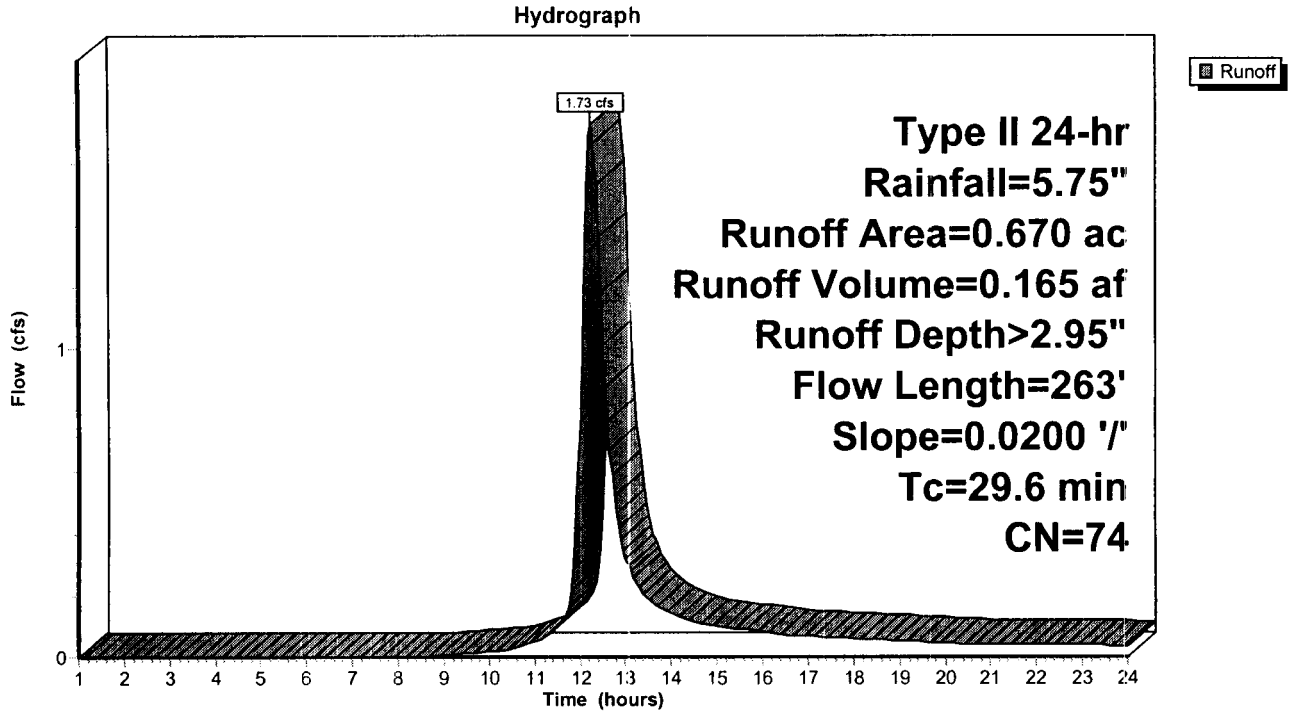
Runoff = 1.73 cfs @ 12.24 hrs, Volume= 0.165 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.670	74	>75% Grass cover, Good, HSG C
0.670		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.6	263	0.0200	0.15		**Sheet Flow, Slag Cap** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment NA3: Slag Cap Area next to East Ditch (.67 Ac)



Subcatchment NA4: (.16 Ac)

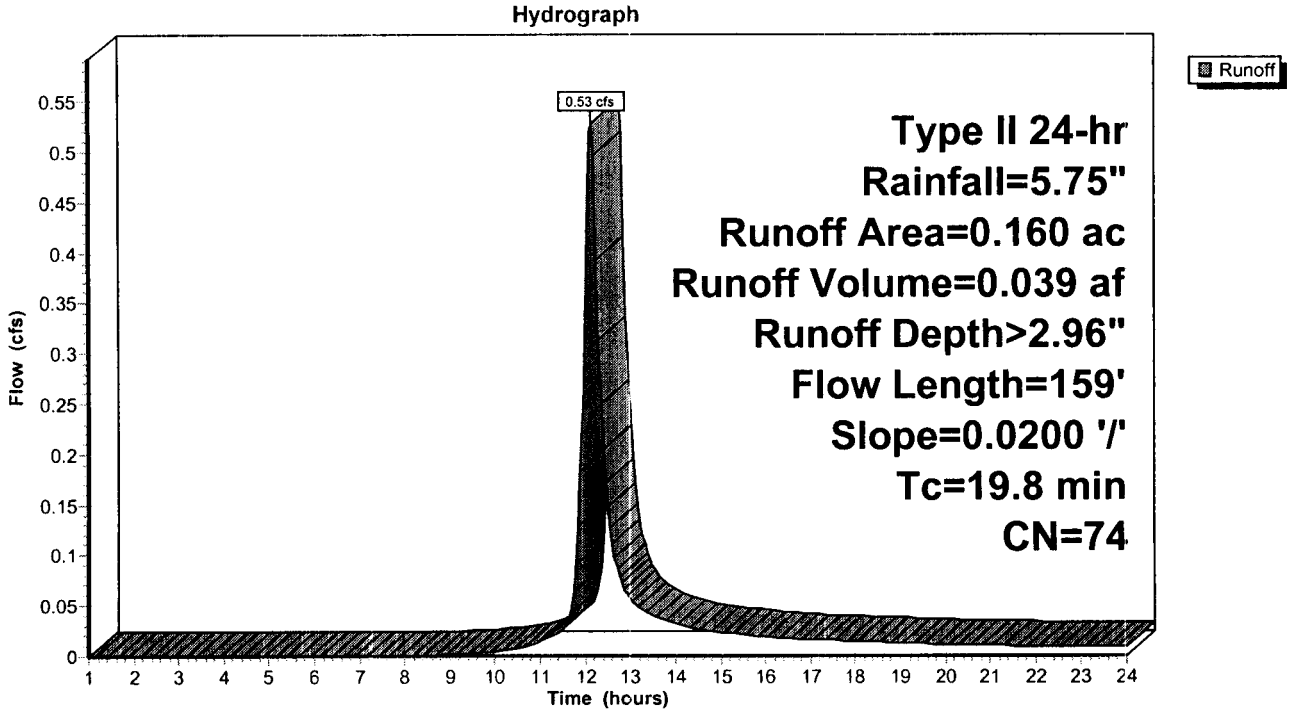
Runoff = 0.53 cfs @ 12.13 hrs, Volume= 0.039 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.160	74	>75% Grass cover, Good, HSG C
0.160		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	159	0.0200	0.13		**Sheet Flow, Last Area to Drain into East Ditch before Pond** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment NA4: (.16 Ac)



Subcatchment NA5: Slag Cap North Far North End (.18 Ac)

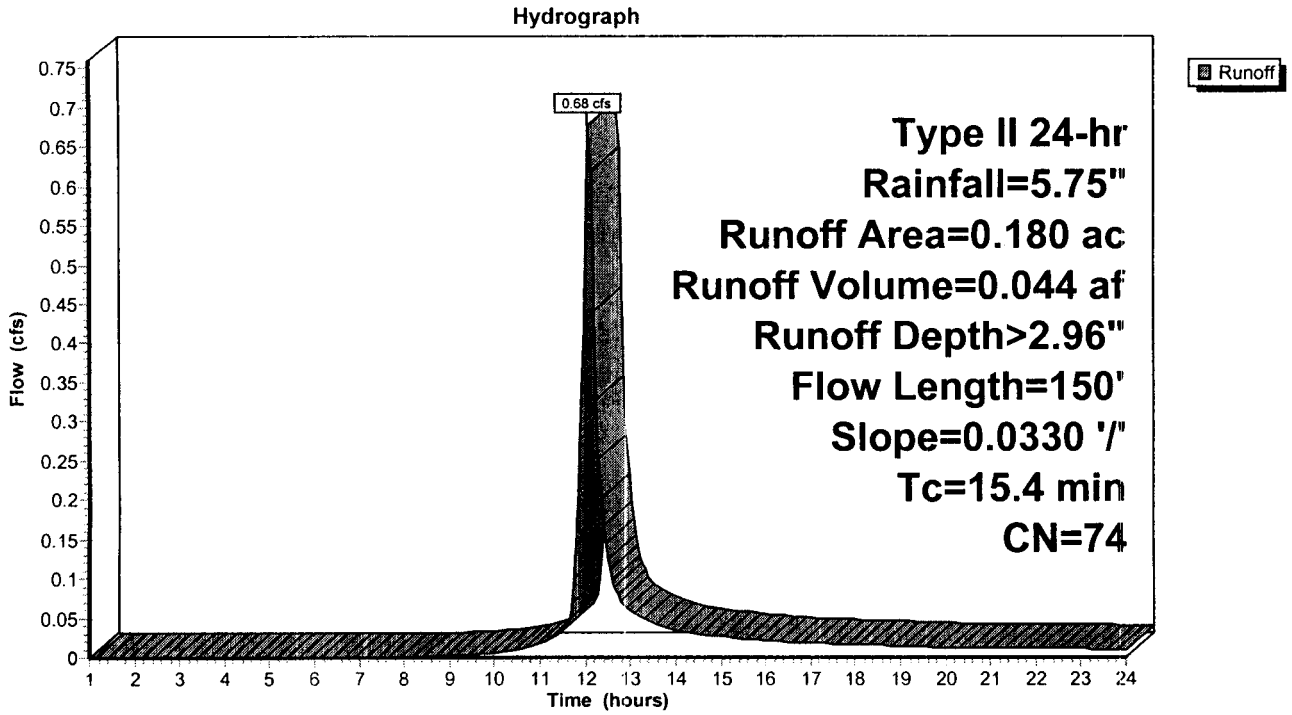
Runoff = 0.68 cfs @ 12.08 hrs, Volume= 0.044 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.180	74	>75% Grass cover, Good, HSG C
0.180		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0330	0.16		**Sheet Flow, Slag Cap Flowing Directly into North Retention P** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment NA5: Slag Cap North Far North End (.18 Ac)



Subcatchment NA6: Slag Cap North End Draining to West Ditch (.59 Ac)

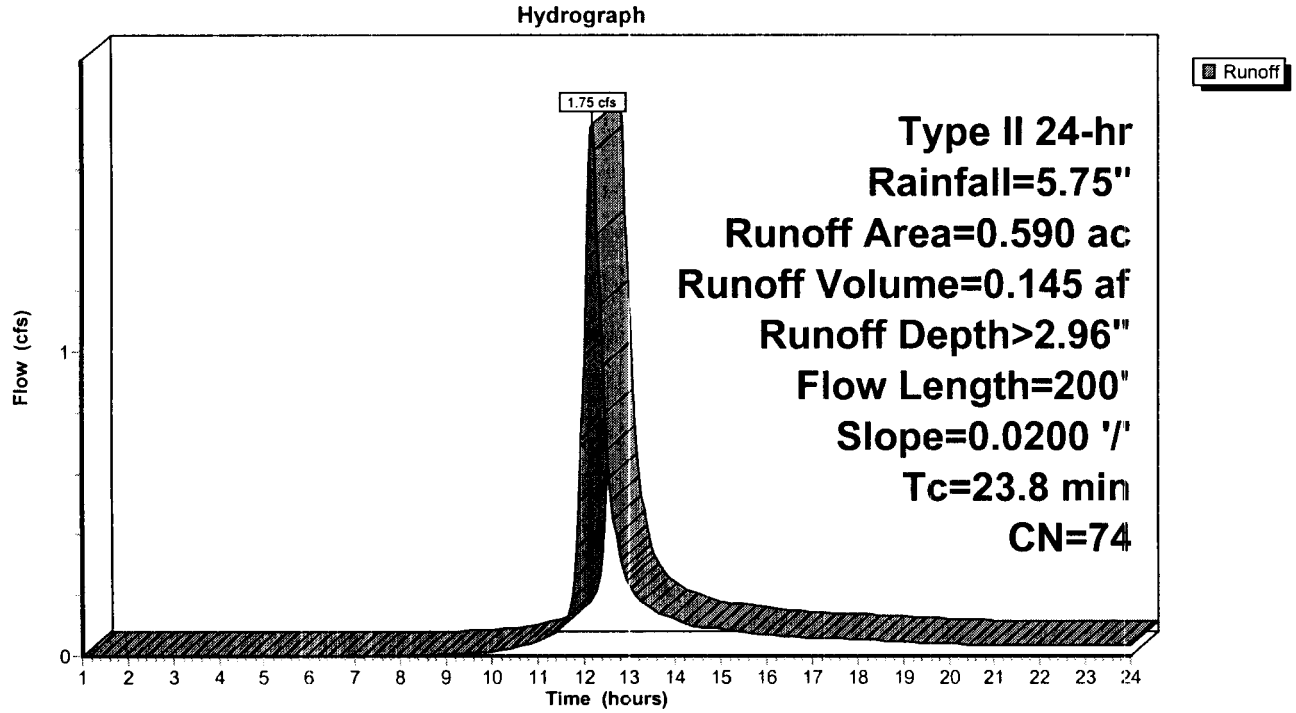
Runoff = 1.75 cfs @ 12.17 hrs, Volume= 0.145 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.75"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
0.590		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	200	0.0200	0.14		**Sheet Flow, Typical Flow** Grass: Dense n= 0.240 P2= 3.50"

Subcatchment NA6: Slag Cap North End Draining to West Ditch (.59 Ac)



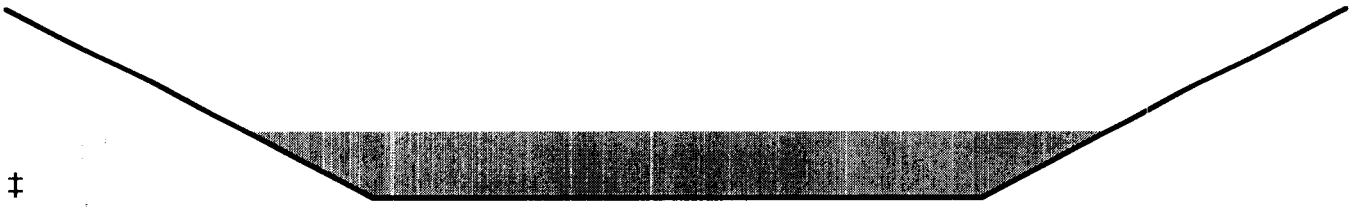
Reach NE1R: East Slag Cap Ditch - Top

Inflow Area = 0.680 ac, Inflow Depth > 2.95"
Inflow = 1.79 cfs @ 12.23 hrs, Volume= 0.167 af
Outflow = 1.77 cfs @ 12.29 hrs, Volume= 0.167 af, Atten= 1%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.33 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.42 fps, Avg. Travel Time= 6.3 min

Peak Storage= 215 cf @ 12.26 hrs, Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.80', Capacity at Bank-Full= 12.26 cfs

4.00' x 0.80' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.80'
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 713.80', Outlet Invert= 713.00'



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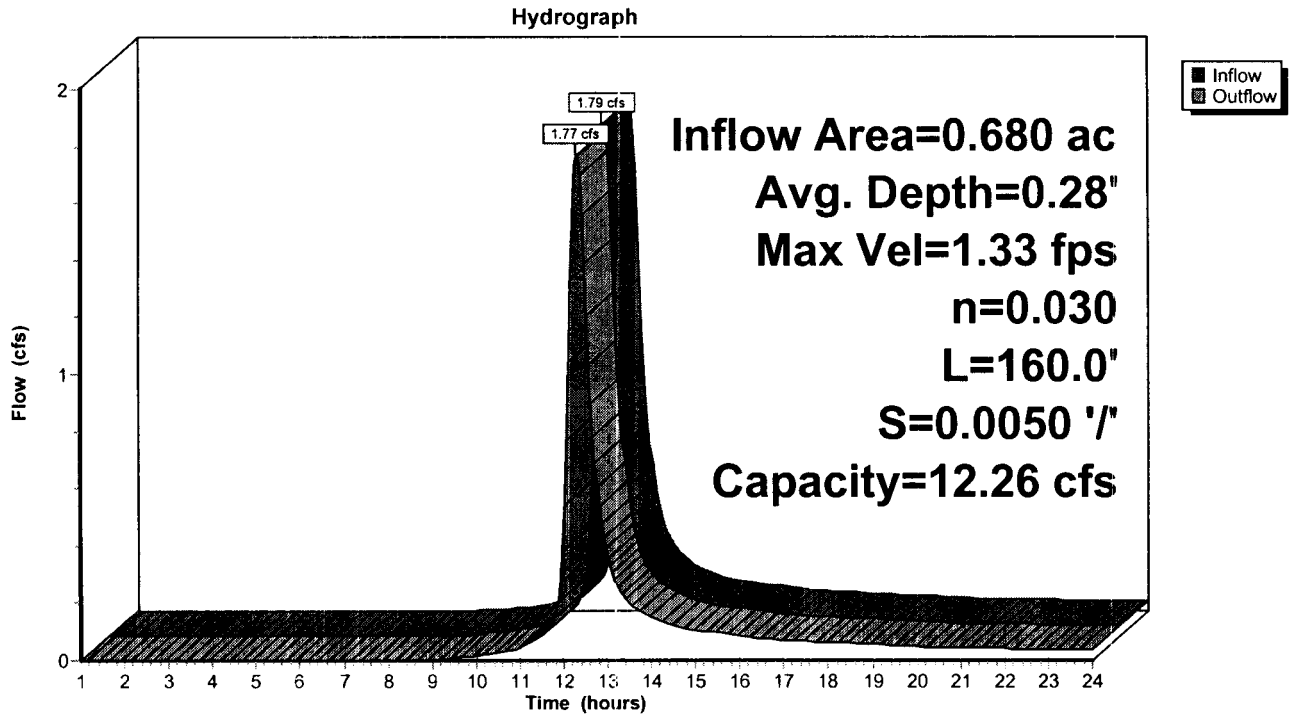
Reach NE1R: East Slag Cap Ditch - Top



Reach NE2R: East Slag Cap Ditch

[61] Hint: Submerged 52% of Reach NE1R bottom

Inflow Area = 1.440 ac, Inflow Depth > 2.95"
Inflow = 3.73 cfs @ 12.26 hrs, Volume= 0.354 af
Outflow = 3.68 cfs @ 12.32 hrs, Volume= 0.353 af, Atten= 1%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 6.0 min

Peak Storage= 441 cf @ 12.29 hrs, Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 18.92 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 713.00', Outlet Invert= 712.00'

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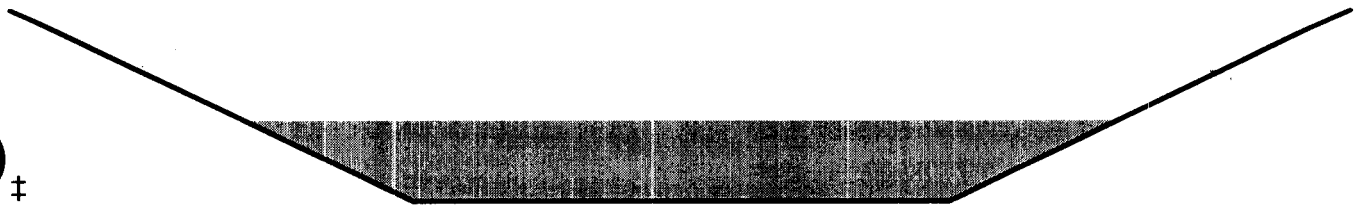
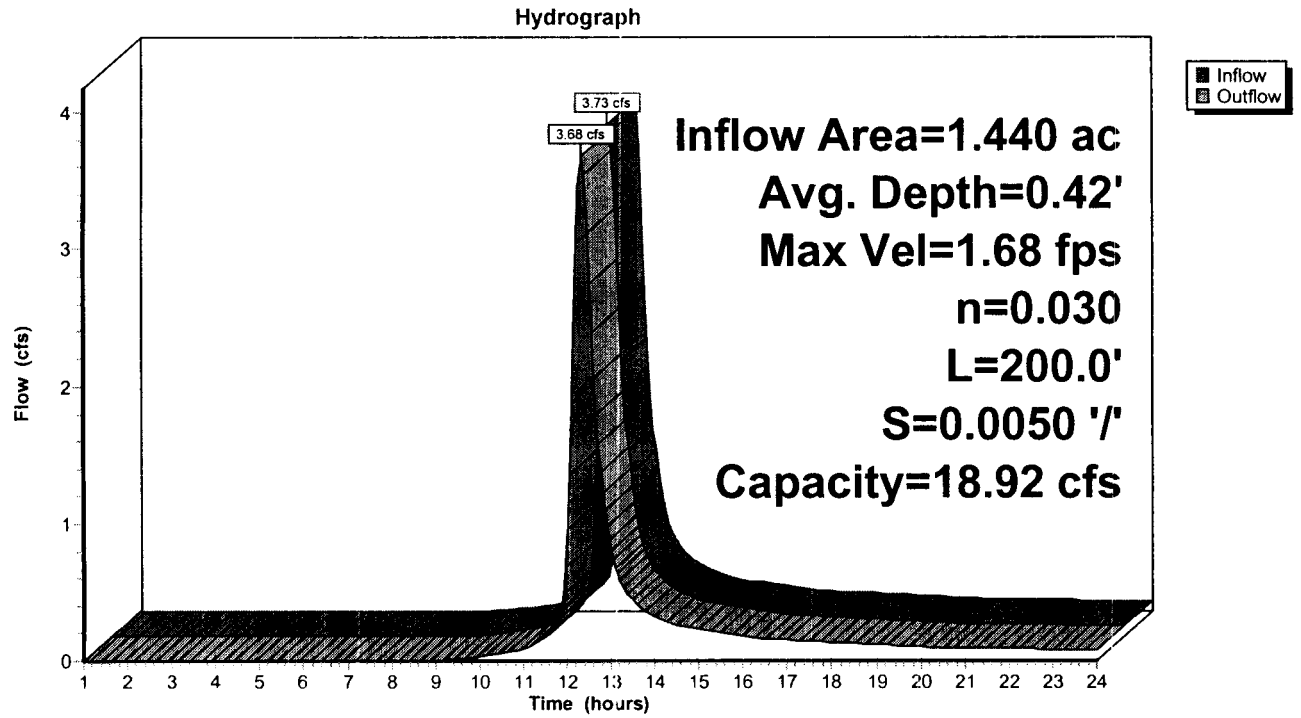


Reach NE2R: East Slag Cap Ditch



Reach NE3R: East Slag Cap Ditch

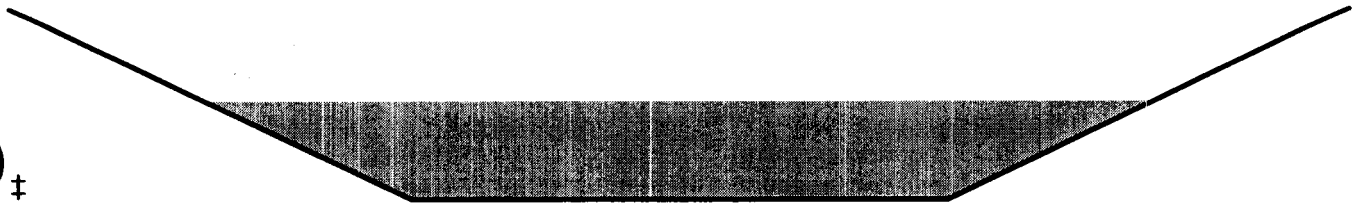
[61] Hint: Submerged 51% of Reach NE2R bottom

Inflow Area = 2.110 ac, Inflow Depth > 2.94"
Inflow = 5.34 cfs @ 12.30 hrs, Volume= 0.518 af
Outflow = 5.28 cfs @ 12.35 hrs, Volume= 0.516 af, Atten= 1%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.87 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 5.2 min

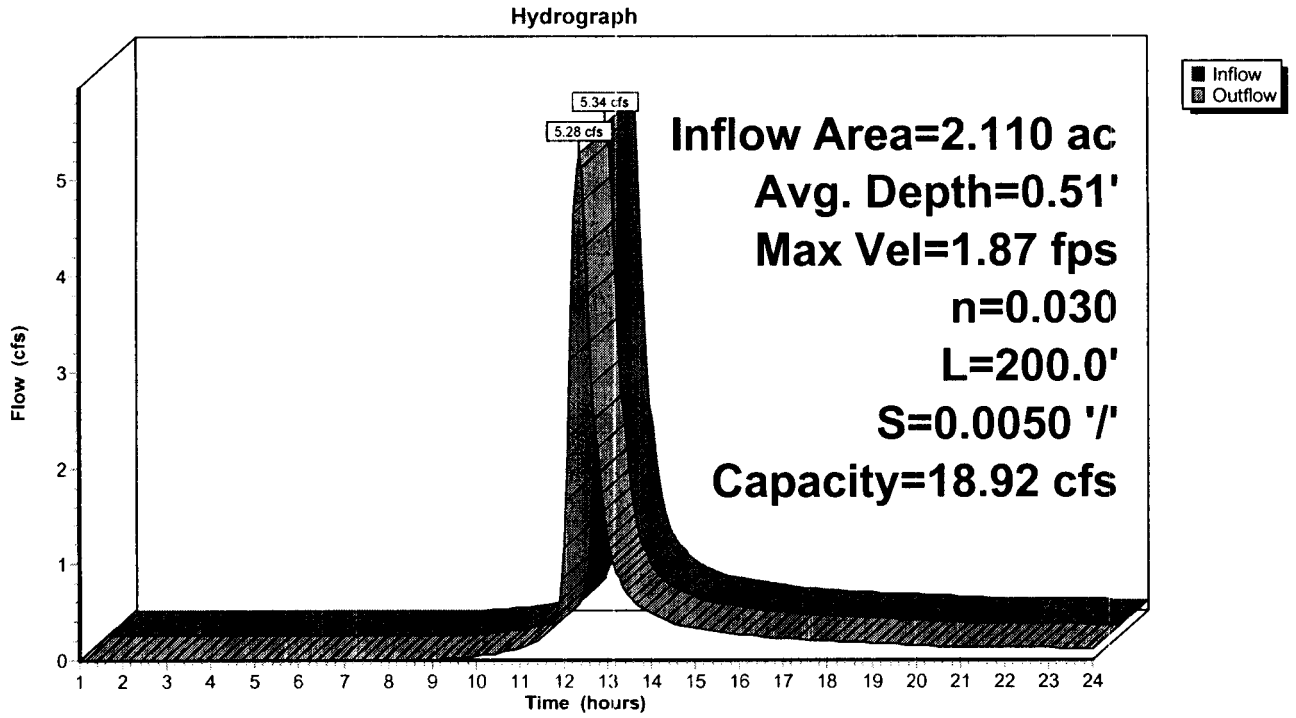
Peak Storage= 567 cf @ 12.32 hrs, Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 18.92 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 712.00', Outlet Invert= 711.00'



‡

Reach NE3R: East Slag Cap Ditch



Reach NE4R: End Section of East Ditch

[61] Hint: Submerged 40% of Reach NE3R bottom

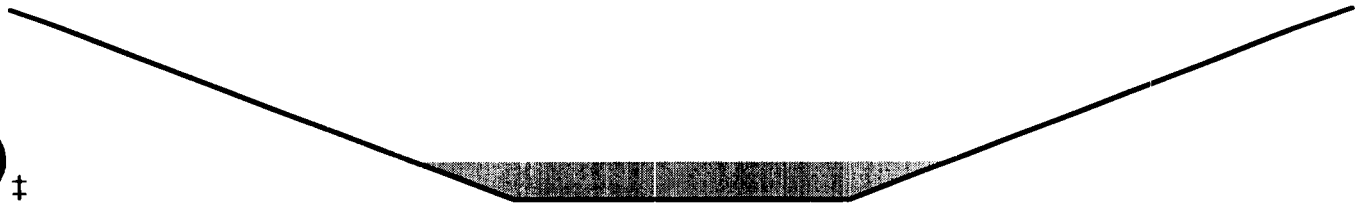
Inflow Area = 2.270 ac, Inflow Depth > 2.94"
Inflow = 5.53 cfs @ 12.34 hrs, Volume= 0.556 af
Outflow = 5.51 cfs @ 12.36 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.66 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 1.4 min

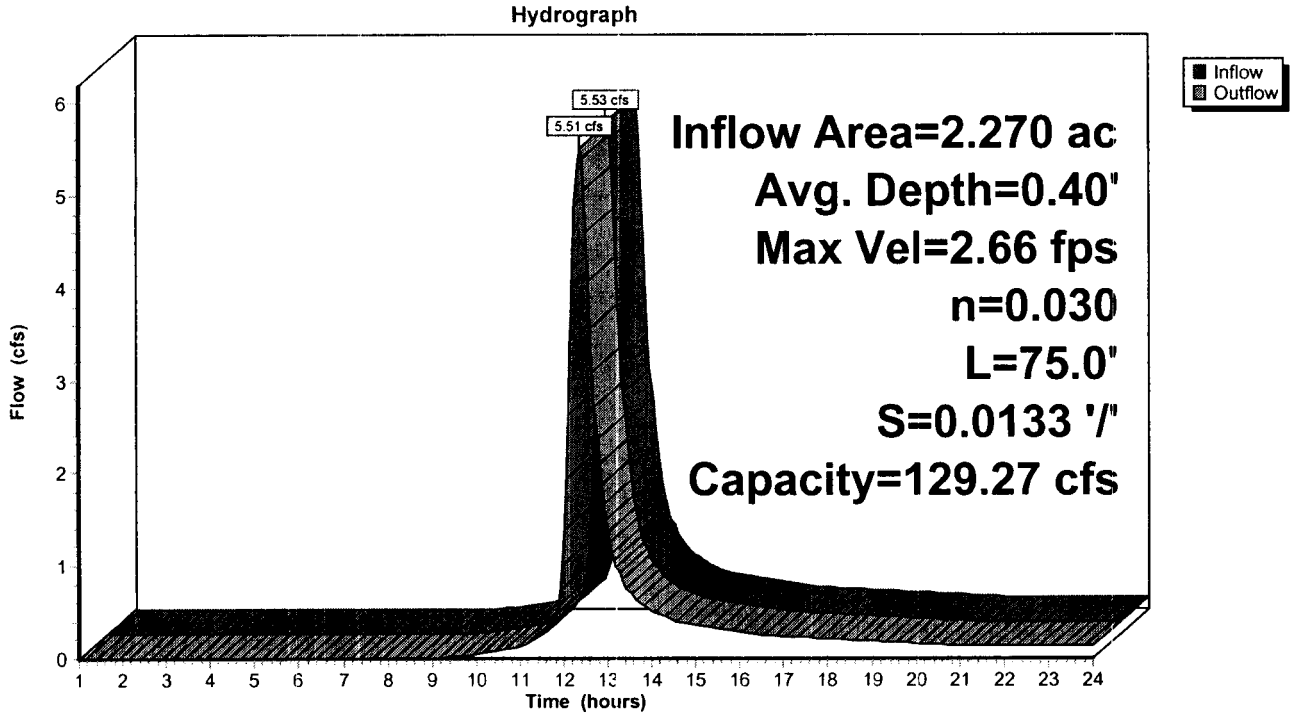
Peak Storage= 156 cf @ 12.35 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 129.27 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 75.0' Slope= 0.0133 '/'
Inlet Invert= 711.00', Outlet Invert= 710.00'

‡



Reach NE4R: End Section of East Ditch



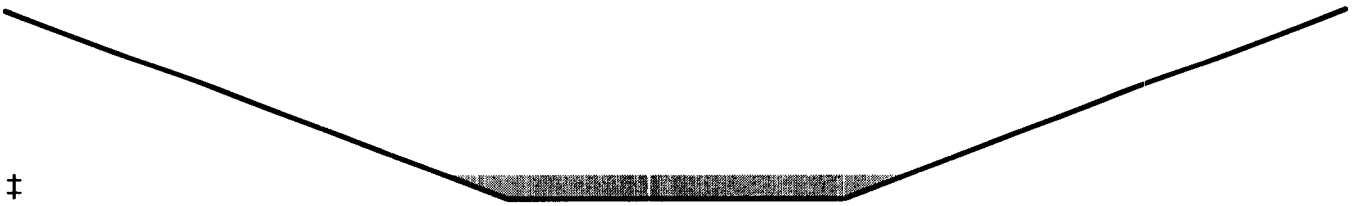
Reach NW5R: West Slag Cap Ditch

Inflow Area = 0.590 ac, Inflow Depth > 2.96"
Inflow = 1.75 cfs @ 12.17 hrs, Volume= 0.145 af
Outflow = 1.71 cfs @ 12.26 hrs, Volume= 0.145 af, Atten= 2%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 9.8 min

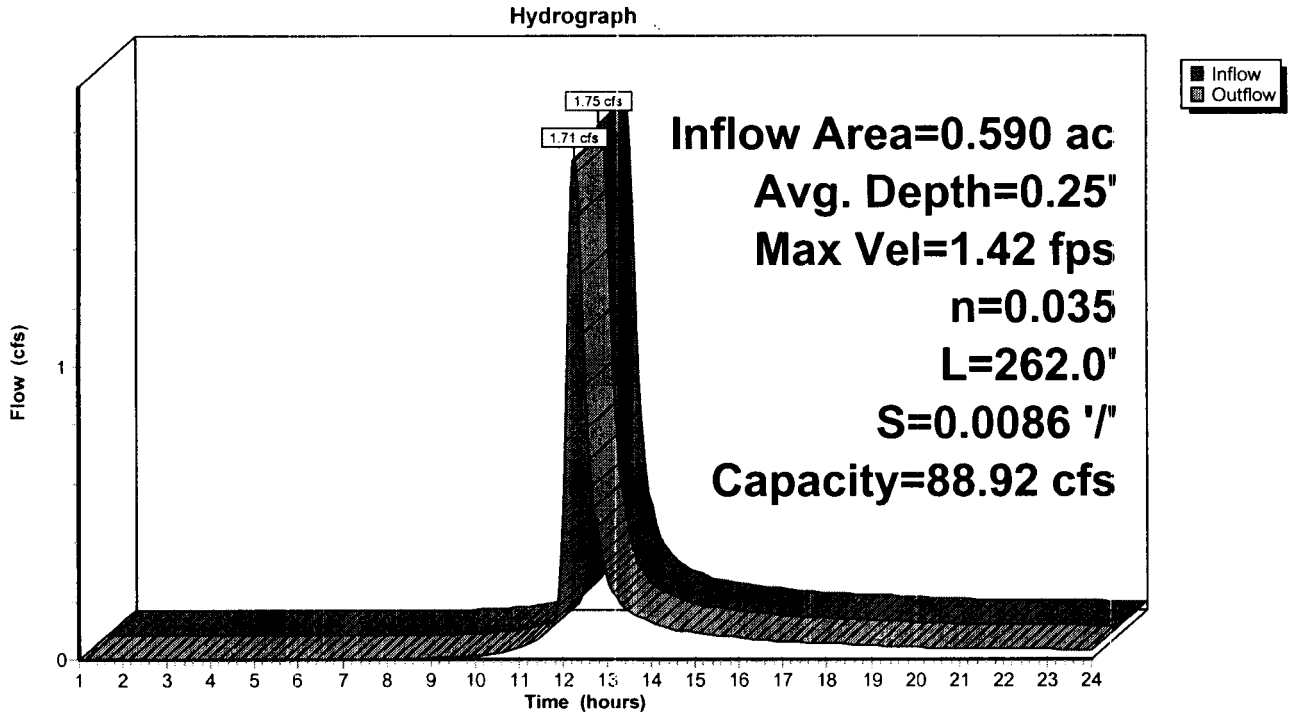
Peak Storage= 317 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 88.92 cfs

4.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 16.00'
Length= 262.0' Slope= 0.0086 '/'
Inlet Invert= 713.25', Outlet Invert= 711.00'



‡

Reach NW5R: West Slag Cap Ditch



Pond 1P: Outfall for New Pond N1P

[57] Hint: Peaked at 706.40' (Flood elevation advised)

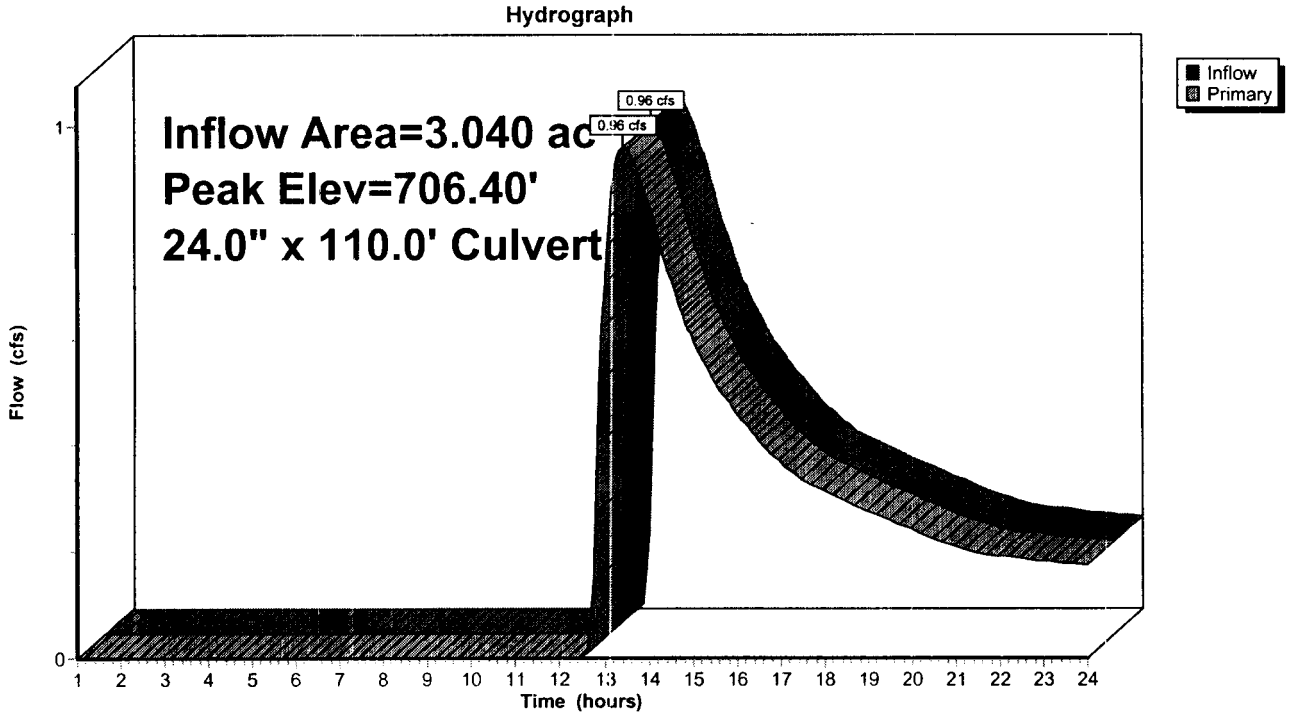
Inflow Area =	3.040 ac,	Inflow Depth >	1.42"	
Inflow =	0.96 cfs @	13.45 hrs, Volume=	0.360 af	
Outflow =	0.96 cfs @	13.45 hrs, Volume=	0.360 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.96 cfs @	13.45 hrs, Volume=	0.360 af	

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 706.40' @ 13.45 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	706.00'	**24.0" x 110.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 695.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.96 cfs @ 13.45 hrs HW=706.40' (Free Discharge)
1=Culvert (Inlet Controls 0.96 cfs @ 2.15 fps)

Pond 1P: Outfall for New Pond N1P



Pond N1P: North Detention Pond (.2 Ac)

Inflow Area = 3.040 ac, Inflow Depth > 2.94"
Inflow = 7.30 cfs @ 12.32 hrs, Volume= 0.745 af
Outflow = 0.96 cfs @ 13.45 hrs, Volume= 0.360 af, Atten= 87%, Lag= 67.8 min
Primary = 0.96 cfs @ 13.45 hrs, Volume= 0.360 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 708.87' @ 13.45 hrs Surf.Area= 0.212 ac Storage= 0.432 af

Plug-Flow detention time= 268.7 min calculated for 0.359 af (48% of inflow)
Center-of-Mass det. time= 151.4 min (1,001.5 - 850.1)

Volume	Invert	Avail.Storage	Storage Description
#1	706.00'	0.946 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

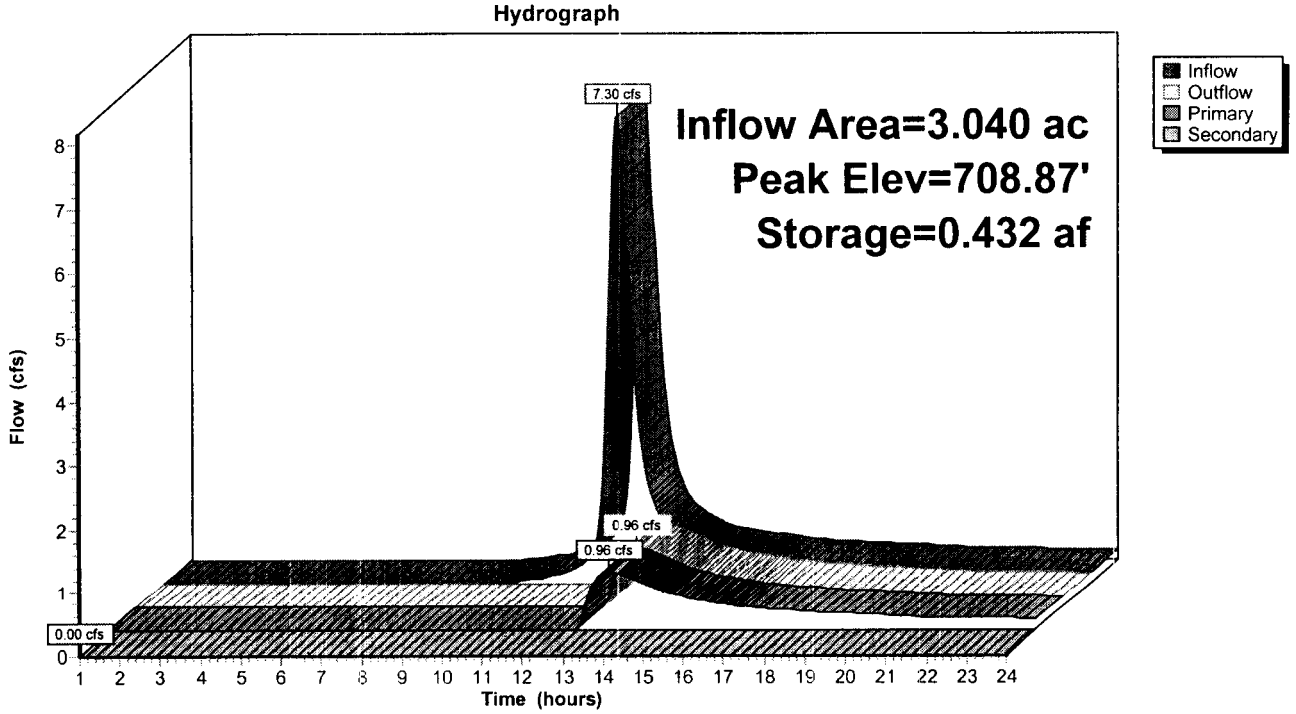
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
706.00	0.054	0.000	0.000
707.00	0.148	0.101	0.101
708.00	0.177	0.162	0.263
709.00	0.217	0.197	0.460
710.00	0.240	0.228	0.689
711.00	0.274	0.257	0.946

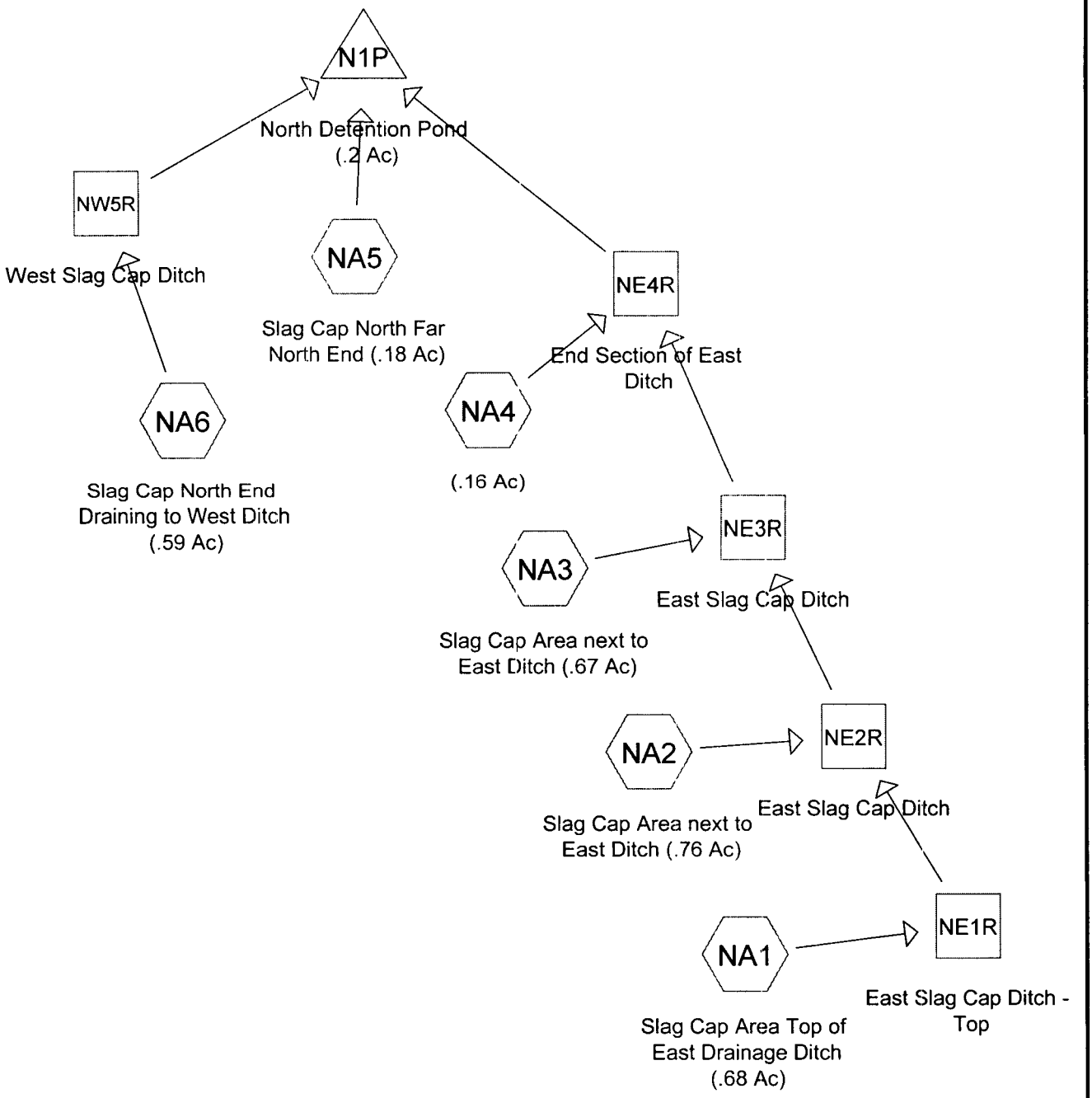
Device	Routing	Invert	Outlet Devices
#1	Primary	708.50'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#2	Primary	709.50'	**12.6' long Sharp-Crested Rectangular Weir** 0 End Contraction(s) 3.0' Crest Height
#3	Secondary	710.50'	**Custom Weir/Orifice, C= 2.62** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 Width (feet) 29.00 29.20 29.40 29.60 29.80 30.00

Primary OutFlow Max=0.96 cfs @ 13.45 hrs HW=708.87' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.96 cfs @ 2.07 fps)
└—**2=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=706.00' (Free Discharge)
↑—**3=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond N1P: North Detention Pond (.2 Ac)





Subcat Reach Pond Link

Drainage Diagram for Mar 10 2208 Redesign 100 yr Event Slag Cap North Retention Pond (3.24 Ac)

Prepared by {enter your company name here} 06/15/2009

Pond N1P: North Detention Pond (.2 Ac)

[61] Hint: Submerged 52% of Reach NE4R bottom

Inflow Area = 3.040 ac, Inflow Depth > 4.21"
Inflow = 10.60 cfs @ 12.30 hrs, Volume= 1.068 af
Outflow = 0.47 cfs @ 16.32 hrs, Volume= 0.210 af, Atten= 96%, Lag= 240.8 min
Primary = 0.47 cfs @ 16.32 hrs, Volume= 0.210 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 710.52' @ 16.32 hrs Surf.Area= 0.266 ac Storage= 0.861 af

Plug-Flow detention time= 463.8 min calculated for 0.209 af (20% of inflow)
Center-of-Mass det. time= 323.6 min (1,163.1 - 839.5)

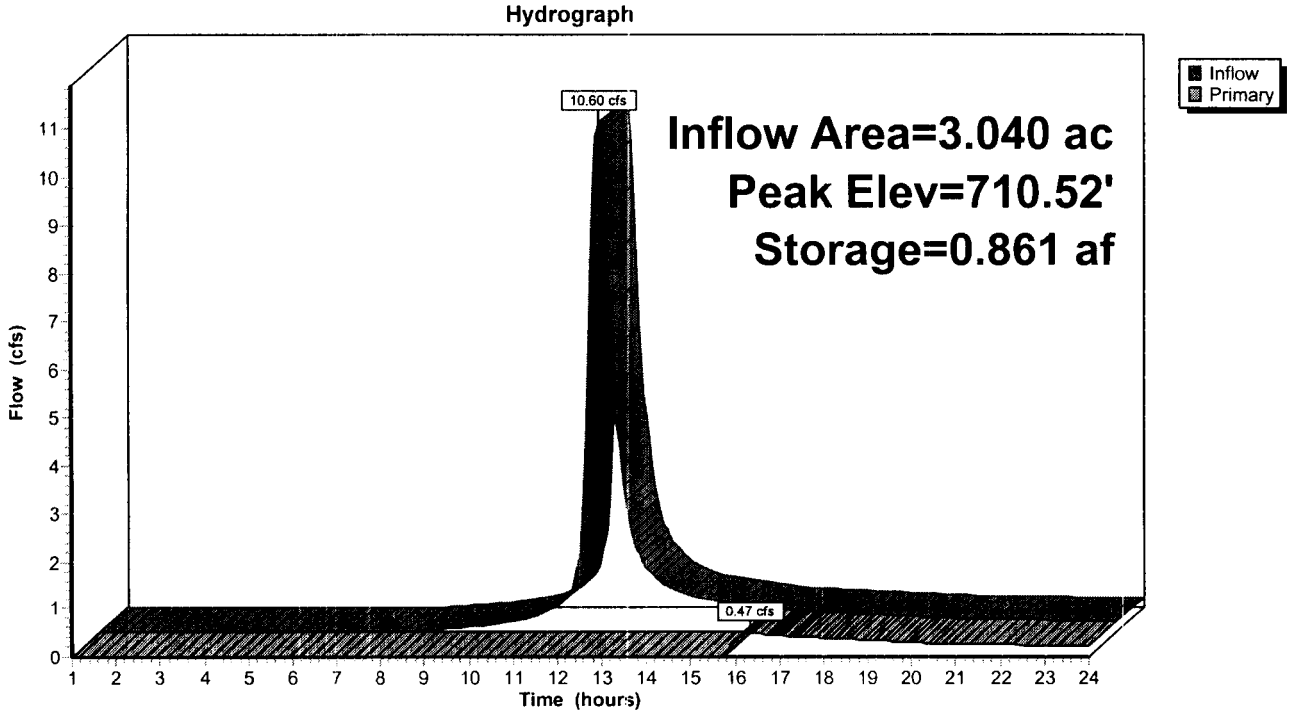
Volume	Invert	Avail.Storage	Storage Description
#1	706.00'	0.991 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
706.00	0.000	0.000	0.000
707.00	0.174	0.087	0.087
708.00	0.200	0.187	0.274
709.00	0.226	0.213	0.487
710.00	0.252	0.239	0.726
711.00	0.278	0.265	0.991

Device	Routing	Invert	Outlet Devices
#1	Primary	710.50'	**Custom Weir/Orifice, C= 2.62** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 Width (feet) 29.00 29.20 29.40 29.60 29.80 30.00

Primary OutFlow Max=0.31 cfs @ 16.32 hrs HW=710.52' (Free Discharge)
↑—**1=Custom Weir/Orifice** (Weir Controls 0.31 cfs @ 0.49 fps)

Pond N1P: North Detention Pond (.2 Ac)



Watts Bar Fossil Plant

Slag Processing Area
Ash Sampling and Lab Testing

APPENDIX G OF
CLOSURE PLAN

Watts Bar Fossil Plant
Ash Pile Sampling

August 1, 2006

Ash pile samples were collected during the months of June and July of this year, by Environmental Engineering Services East (EESE) personnel. A truck mounted Geoprobe® Model 5400 was used for the collection of samples. Continuous sampling was conducted from the surface to the interface with natural soils. Each sample was logged and described, then placed in jars for shipment to TVA's Environmental Chemistry Laboratory. The samples will be analyzed for TCLP, Total Metals, and Sulfates.

A total of seven locations were bored with the Geoprobe®. Each location was assigned a number starting with GP-1 through GP-7. Locations GP-1, GP-2, and GP-3 were combined into one sample and labeled WBF-Slag. Sample locations GP-4, GP-5, and GP-7 were stand alone, and sampled individually, location GP-6 was for depth to natural soil only and no analysis was requested. The sample labeled WBF-Surface was collected from various location of ash pile and combined for a representative of pyretic material on the surface. The boring logs and a field site map showing approximate location of these borings is attached.

If you have any questions or concerns, please contact Jim Overton at 673-2363.

Prepared by: J.A. Overton

Watts Bar FP Ash Pile Sampling **Well ID: GP-1**

Depth Ft.	Description	Well Construction
		TC_____ SE _____ _____Stickup
0 to 2.1	Slag,coarse, black/brown, dry	**NO WELL INSTALLED**
2.1 to 6.7	Ash, fine,gray with some coarse black slag, dry	
6.7 to 9.1	Ash, fine, black, soft, moist	
9.1 to 10.7	Slag, coarse, black, wet	
10.7 to 12.0	Clay, sandy/silty, tan with gray, moist	
	TD = 12 feet	

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 6-22-06
Drilled by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____

Watts Bar FP Ash Pile Sampling **Well ID: GP-2**

Depth Ft.	Description	Well Construction
		TC_____ SE _____ _____Stickup
0 to 1.7	Slag,coarse, black/brown, dry	**NO WELL INSTALLED**
1.7 to 4.1	Slag mixed with ash, gray/black, dry	
4.1 to 8.5	Ash, fine, black, soft, moist	
8.5 to 9.1	Slag mixed with ash, black, wet	
9.1 to 10.0	Clay, sandy/silty, tan	
	TD = 10 feet	

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 6-22-06
Drilled by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____

Watts Bar FP Ash Pile Sampling **Well ID: GP-3**

Depth Ft.	Description	Well Construction
		TC_____ SE _____ _____Stickup
0 to 1.8	Slag,coarse, black/brown, dry	**NO WELL INSTALLED**
1.8 to 2.3	Ash, fine,gray, dry	
2.3 to 2.6	Ash/clay mix, fine, black, soft, moist	
2.6 to 5.1	Slag, coarse,black, moist	
5.1 to 8.8	Ash, fine, black, moist	
8.8 to 9.6	Slag,coarse, black, moist	
9.6 to 12.0	Clay, sandy, tan with gray,firm	
	TD = 12 feet	

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 6-22-06
Drilled by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____

Watts Bar FP Ash Pile Sampling	Well ID: GP-4

Depth Ft.	Description	Well Construction
		TC_____ SE _____ _____Stickup
0 to 3.2	Ash/clay, sandy/silty, brown black, dry	**NO WELL INSTALLED**
3.2 to 5.7	Ash, fine, black ,moist	
5.7 to 11.7	Ash, fine, gray, soft, moist	
11.7 to 14.2	Slag and ash, coarse black/brown, moist	
14.2 to 16	Clay, sandy/silty, tan with gray ,firm TD = 16 feet	

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 6-22-06
Drilled by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____

Watts Bar FP Ash Pile Sampling **Well ID: GP-5**

Depth Ft.	Description	Well Construction
		TC_____ SE _____ _____Stickup
0 to 3.6	Slag, medium/fine, brown/black, dry	**NO WELL INSTALLED**
3.6 to 5.1	Slag, coarse, brown/black, dry	
5.1 to 5.8	Slag, medium/fine, black, moist	
5.8 to 21.5	Ash, fine black, moist	
21.5 to 22.0	Clay, sandy/silty, tan with gray ,firm, moist TD = 22 feet	

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 7-17-06
Drilled by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____

Watts Bar FP Ash Pile Sampling **Well ID: GP-6**

Depth Ft.	Description	Well Construction	
		TC_____ SE _____	_____Stickup
0 to 7.1	Ash mix	**NO SAMPLE TAKEN**	**NO WELL INSTALLED**
7.1 TO 8.0	Clay, sandy/silty, tan, firm	**Confirm Clay Depth**	
	TD= 8.0		

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 7-24-06
Drilled by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____

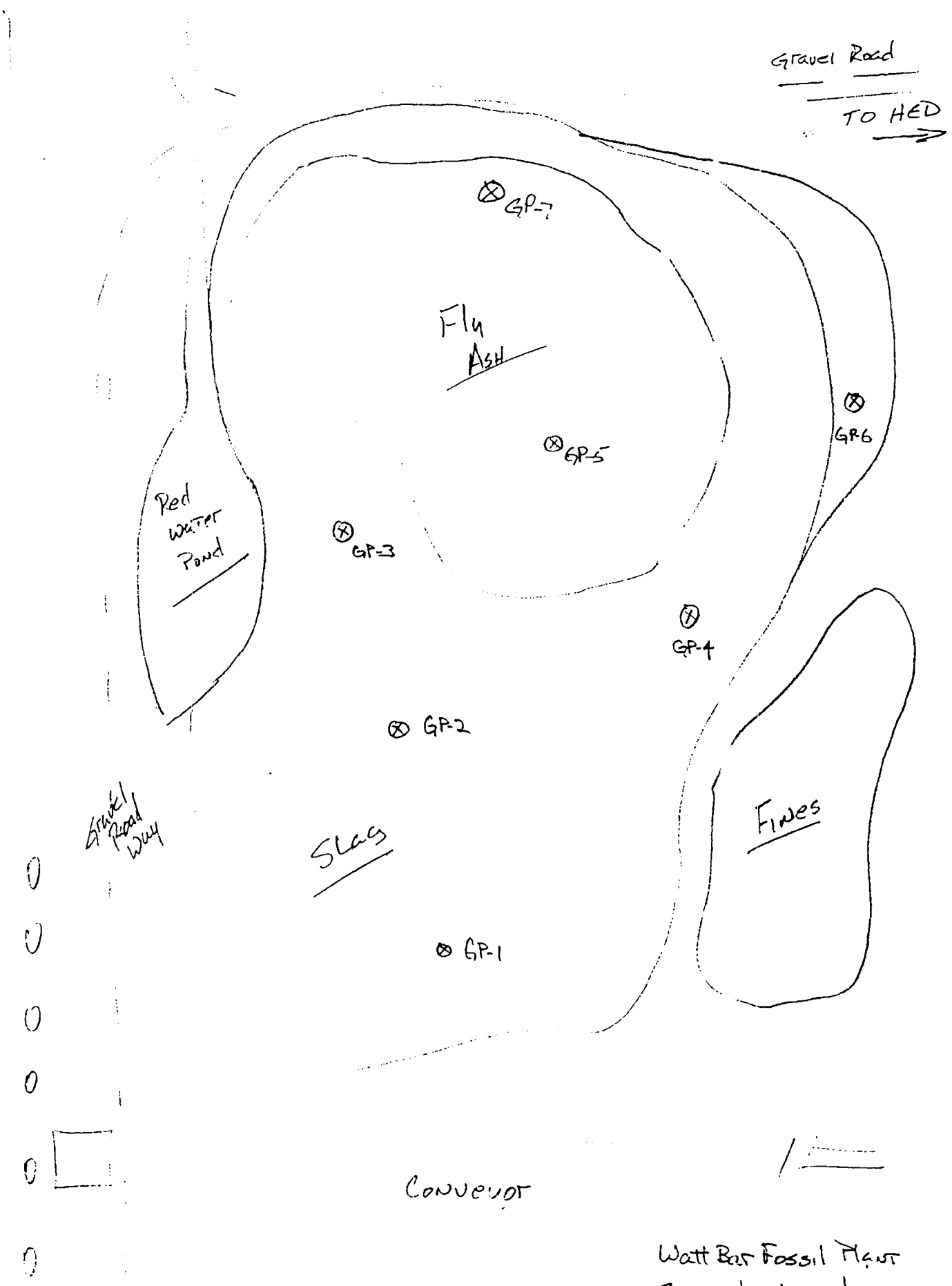
Watts Bar FP Ash Pile Sampling **Well ID: GP-7**

Depth Ft.	Description	Well Construction
		TC_____ SE _____ _____Stickup
0 to 4.0	Ash/clay mix, fine, brown.black/tan, dry	**NO WELL INSTALLED**
4.0 to 14.8	Ash, medium/fine, gray/black,dry	
14.8 to 17.2	Ash, fine, gray, moist	
17.2 to 18.0	Ash, fine black, moist	
	TD = 18.0 feet	

Project: Watts Bar Ash Pile
Company: TVA
Location: Ash Pile

Drill Date: 7-24-06
Drillec by: TVA
Drill Method: Geoprobe

North _____
West _____
Top Casing ft. _____



Watt Bar Fossil Plant
Geoprobe Locations
Ash Pile Area
June - July 2006

No Scale

Data Report Number: 060828-92857
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Jim Overton
GRN 2F-K
Phone: Not Available
Fax : Not Available
E-Mail: jaoverton@tva.gov; EDM

Location Code: WBF

Field ID: WBF-SLAG

Sample Description: WBF-SLAG

Sample ID: AG47628 **LRF ID:** 06080013
Matrix: Solids
Date Collected: 06/22/2006
Time Collected: 0:00 EST
Date Received: 08/01/2006
Time Received: 10:11
Project Manager: Ricardo I. Gilbert

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Arsenic, TCLP Extract	7440-38-2	< MDL	mg/L	0.1	08/08/2006	13:07	LMJ	EPA 6010
Barium, TCLP Extract	7440-39-3	0.18	mg/L	0.01	08/08/2006	13:07	LMJ	EPA 6010
Cadmium, TCLP Extract	7440-43-9	< MDL	mg/L	0.005	08/08/2006	13:07	LMJ	EPA 6010
Chromium, TCLP Extract	7440-47-3	< MDL	mg/L	0.05	08/08/2006	13:07	LMJ	EPA 6010
Lead, TCLP Extract	7439-92-1	< MDL	mg/L	0.05	08/08/2006	13:07	LMJ	EPA 6010
Selenium, TCLP Extract	7782-49-2	< MDL	mg/L	0.1	08/08/2006	13:07	LMJ	EPA 6010
Silver, TCLP Extract	7440-22-4	< MDL	mg/L	0.01	08/08/2006	13:07	LMJ	EPA 6010
ercury , TCLP Extract	7439-97-6	< MDL	mg/L	0.002	08/04/2006	10:14	WMG	EPA 7470
senic, RCRA Total	7440-38-2	11	mg/Kg	5	08/22/2006	19:37	LMJ	EPA 6010
Barium, RCRA Total	7440-39-3	180	mg/Kg	0.5	08/22/2006	19:37	LMJ	EPA 6010
Cadmium, RCRA Total	7440-43-9	< MDL	mg/Kg	0.25	08/22/2006	19:37	LMJ	EPA 6010
Chromium, RCRA Total	7440-47-3	46	mg/Kg	2.5	08/22/2006	19:37	LMJ	EPA 6010
Lead, RCRA Total	7439-92-1	30	mg/Kg	2.5	08/22/2006	19:37	LMJ	EPA 6010
Selenium, RCRA Total	7782-49-2	< MDL	mg/Kg	5	08/22/2006	19:37	LMJ	EPA 6010
Silver, RCRA Total	7440-22-4	< MDL	mg/Kg	0.5	08/22/2006	19:37	LMJ	EPA 6010
Mercury, RCRA Total	7439-97-6	< MDL	mg/Kg	0.1	08/06/2006	11:56	WMG	EPA 7470
Sulfate, Total	14808-79-8	5800	mg/Kg	40	08/14/2006	9:17	GMP	ASTM D 516

Sample Comments: Sample was brought in , past the holding time.

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 060828-92857
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Jim Overton
GRN 2F-K
Phone: Not Available
Fax : Not Available
E-Mail: jaoverton@tva.gov; EDM

Location Code: WBF

Field ID: WBF-GP4

Sample Description: WBF-GP4

Sample ID: AG47629 **LRF ID:** 06080013
Matrix: Solids
Date Collected: 06/22/2006
Time Collected: 0:00 EST
Date Received: 08/01/2006
Time Received: 10:11
Project Manager: Ricardo I. Gilbert

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Arsenic, TCLP Extract	7440-38-2	< MDL	mg/L	0.1	08/08/2006	13:14	LMJ	EPA 6010
Barium, TCLP Extract	7440-39-3	0.26	mg/L	0.01	08/08/2006	13:14	LMJ	EPA 6010
Cadmium, TCLP Extract	7440-43-9	0.041	mg/L	0.005	08/08/2006	13:14	LMJ	EPA 6010
Chromium, TCLP Extract	7440-47-3	< MDL	mg/L	0.05	08/08/2006	13:14	LMJ	EPA 6010
Lead, TCLP Extract	7439-92-1	< MDL	mg/L	0.05	08/08/2006	13:14	LMJ	EPA 6010
Selenium, TCLP Extract	7782-49-2	< MDL	mg/L	0.1	08/08/2006	13:14	LMJ	EPA 6010
Silver, TCLP Extract	7440-22-4	< MDL	mg/L	0.01	08/08/2006	13:14	LMJ	EPA 6010
lercury , TCLP Extract	7439-97-6	< MDL	mg/L	0.002	08/04/2006	10:16	WMG	EPA 7470
rsenic, RCRA Total	7440-38-2	86	mg/Kg	5	08/22/2006	19:41	LMJ	EPA 6010
Barium, RCRA Total	7440-39-3	240	mg/Kg	0.5	08/22/2006	19:41	LMJ	EPA 6010
Cadmium, RCRA Total	7440-43-9	4.8	mg/Kg	0.25	08/22/2006	19:41	LMJ	EPA 6010
Chromium, RCRA Total	7440-47-3	73	mg/Kg	2.5	08/22/2006	19:41	LMJ	EPA 6010
Lead, RCRA Total	7439-92-1	67	mg/Kg	2.5	08/22/2006	19:41	LMJ	EPA 6010
Selenium, RCRA Total	7782-49-2	< MDL	mg/Kg	5	08/22/2006	19:41	LMJ	EPA 6010
Silver, RCRA Total	7440-22-4	< MDL	mg/Kg	0.5	08/22/2006	19:41	LMJ	EPA 6010
Mercury, RCRA Total	7439-97-6	0.3	mg/Kg	0.1	08/06/2006	12:02	WMG	EPA 7470
Sulfate, Total	14808-79-8	6100	mg/Kg	40	08/14/2006	9:29	GMP	ASTM D 516

Sample Comments: Sample was brought in, past the holding time.

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 060828-92857
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Jim Overton
GRN 2F-K
Phone: Not Available
Fax : Not Available
E-Mail: jaoverton@tva.gov; EDM

Location Code: WBF

Field ID: WBF-GP5

Sample Description: WBF-GP5

Sample ID: AG47630 **LRF ID:** 06080013
Matrix: Solids
Date Collected: 07/17/2006
Time Collected: 0:00 EST
Date Received: 08/01/2006
Time Received: 10:11
Project Manager: Ricardo I. Gilbert

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Arsenic, TCLP Extract	7440-38-2	< MDL	mg/L	0.1	08/08/2006	13:20	LMJ	EPA 6010
Barium, TCLP Extract	7440-39-3	0.23	mg/L	0.01	08/08/2006	13:20	LMJ	EPA 6010
Cadmium, TCLP Extract	7440-43-9	0.045	mg/L	0.005	08/08/2006	13:20	LMJ	EPA 6010
Chromium, TCLP Extract	7440-47-3	< MDL	mg/L	0.05	08/08/2006	13:20	LMJ	EPA 6010
Lead, TCLP Extract	7439-92-1	< MDL	mg/L	0.05	08/08/2006	13:20	LMJ	EPA 6010
Selenium, TCLP Extract	7782-49-2	< MDL	mg/L	0.1	08/08/2006	13:20	LMJ	EPA 6010
Silver, TCLP Extract	7440-22-4	< MDL	mg/L	0.01	08/08/2006	13:20	LMJ	EPA 6010
Mercury , TCLP Extract	7439-97-6	< MDL	mg/L	0.002	08/04/2006	10:18	WMG	EPA 7470
Arsenic, RCRA Total	7440-38-2	38	mg/Kg	5	08/22/2006	19:44	LMJ	EPA 6010
Barium, RCRA Total	7440-39-3	330	mg/Kg	0.5	08/22/2006	19:44	LMJ	EPA 6010
Cadmium, RCRA Total	7440-43-9	2.2	mg/Kg	0.25	08/22/2006	19:44	LMJ	EPA 6010
Chromium, RCRA Total	7440-47-3	50	mg/Kg	2.5	08/22/2006	19:44	LMJ	EPA 6010
Lead, RCRA Total	7439-92-1	25	mg/Kg	2.5	08/22/2006	19:44	LMJ	EPA 6010
Selenium, RCRA Total	7782-49-2	< MDL	mg/Kg	5	08/22/2006	19:44	LMJ	EPA 6010
Silver, RCRA Total	7440-22-4	< MDL	mg/Kg	0.5	08/22/2006	19:44	LMJ	EPA 6010
Mercury, RCRA Total	7439-97-6	<MDL	mg/Kg	0.1	08/14/2006	10:22	CLS	EPA 7470
Sulfate, Total	14808-79-8	3100	mg/Kg	40	08/14/2006	9:55	GMP	ASTM D 516

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 060828-92857
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
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Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Jim Overton
GRN 2F-K
Phone: Not Available
Fax : Not Available
E-Mail: jaoverton@tva.gov; EDM

Location Code: WBF

Field ID: WBF-GP7

Sample Description: WBF-GP7

Sample ID: AG47631 **LRF ID:** 06080013
Matrix: Solids
Date Collected: 07/24/2006
Time Collected: 0:00 EST
Date Received: 08/01/2006
Time Received: 10:11
Project Manager: Ricardo I. Gilbert

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Arsenic, TCLP Extract	7440-38-2	< MDL	mg/L	0.1	08/08/2006	11:38	LMJ	EPA 6010
Barium, TCLP Extract	7440-39-3	0.17	mg/L	0.01	08/08/2006	11:38	LMJ	EPA 6010
Cadmium, TCLP Extract	7440-43-9	0.063	mg/L	0.005	08/08/2006	11:38	LMJ	EPA 6010
Chromium, TCLP Extract	7440-47-3	< MDL	mg/L	0.05	08/08/2006	11:38	LMJ	EPA 6010
Lead, TCLP Extract	7439-92-1	< MDL	mg/L	0.05	08/08/2006	11:38	LMJ	EPA 6010
Selenium, TCLP Extract	7782-49-2	< MDL	mg/L	0.1	08/08/2006	11:38	LMJ	EPA 6010
Silver, TCLP Extract	7440-22-4	< MDL	mg/L	0.01	08/08/2006	11:38	LMJ	EPA 6010
Mercury , TCLP Extract	7439-97-6	< MDL	mg/L	0.002	08/06/2006	13:32	WMG	EPA 7470
Arsenic, RCRA Total	7440-38-2	91	mg/Kg	5	08/22/2006	19:47	LMJ	EPA 6010
Barium, RCRA Total	7440-39-3	190	mg/Kg	0.5	08/22/2006	19:47	LMJ	EPA 6010
Cadmium, RCRA Total	7440-43-9	3.7	mg/Kg	0.25	08/22/2006	19:47	LMJ	EPA 6010
Chromium, RCRA Total	7440-47-3	57	mg/Kg	2.5	08/22/2006	19:47	LMJ	EPA 6010
Lead, RCRA Total	7439-92-1	49	mg/Kg	2.5	08/22/2006	19:47	LMJ	EPA 6010
Selenium, RCRA Total	7782-49-2	< MDL	mg/Kg	5	08/22/2006	19:47	LMJ	EPA 6010
Silver, RCRA Total	7440-22-4	< MDL	mg/Kg	0.5	08/22/2006	19:47	LMJ	EPA 6010
Mercury, RCRA Total	7439-97-6	1.3	mg/Kg	0.1	08/14/2006	10:28	CLS	EPA 7470
Sulfate, Total	14808-79-8	7900	mg/Kg	40	08/15/2006	17:13	GMP	ASTM D 516

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 060828-92857
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
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Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Jim Overton
GRN 2F-K
Phone: Not Available
Fax : Not Available
E-Mail: jaoverton@tva.gov; EDM

Location Code: WBF

Field ID: WBF-SURFACE

Sample Description: WBF-SURFACE

Sample ID: AG47632 **LRF ID:** 06080013
Matrix: Solids
Date Collected: 07/24/2006
Time Collected: 0:00 EST
Date Received: 08/01/2006
Time Received: 10:11
Project Manager: Ricardo I. Gilbert

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Arsenic, TCLP Extract	7440-38-2	< MDL	mg/L	0.1	08/08/2006	13:25	LMJ	EPA 6010
Barium, TCLP Extract	7440-39-3	0.17	mg/L	0.01	08/08/2006	13:25	LMJ	EPA 6010
Cadmium, TCLP Extract	7440-43-9	< MDL	mg/L	0.005	08/08/2006	13:25	LMJ	EPA 6010
Chromium, TCLP Extract	7440-47-3	< MDL	mg/L	0.05	08/08/2006	13:25	LMJ	EPA 6010
Lead, TCLP Extract	7439-92-1	< MDL	mg/L	0.05	08/08/2006	13:25	LMJ	EPA 6010
Selenium, TCLP Extract	7782-49-2	< MDL	mg/L	0.1	08/08/2006	13:25	LMJ	EPA 6010
Silver, TCLP Extract	7440-22-4	< MDL	mg/L	0.01	08/08/2006	13:25	LMJ	EPA 6010
Mercury , TCLP Extract	7439-97-6	< MDL	mg/L	0.002	08/04/2006	10:20	WMG	EPA 7470
Arsenic, RCRA Total	7440-38-2	28	mg/Kg	5	08/22/2006	19:51	LMJ	EPA 6010
Barium, RCRA Total	7440-39-3	280	mg/Kg	0.5	08/22/2006	19:51	LMJ	EPA 6010
Cadmium, RCRA Total	7440-43-9	0.56	mg/Kg	0.25	08/22/2006	19:51	LMJ	EPA 6010
Chromium, RCRA Total	7440-47-3	39	mg/Kg	2.5	08/22/2006	19:51	LMJ	EPA 6010
Lead, RCRA Total	7439-92-1	17	mg/Kg	2.5	08/22/2006	19:51	LMJ	EPA 6010
Selenium, RCRA Total	7782-49-2	< MDL	mg/Kg	5	08/22/2006	19:51	LMJ	EPA 6010
Silver, RCRA Total	7440-22-4	< MDL	mg/Kg	0.5	08/22/2006	19:51	LMJ	EPA 6010
Mercury, RCRA Total	7439-97-6	0.6	mg/Kg	0.1	08/14/2006	10:34	CLS	EPA 7470
Sulfate, Total	14808-79-8	8400	mg/Kg	40	08/15/2006	17:37	GMP	ASTM D 516

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Central Laboratories Services data report number 060828-92857 was electronically approved using Labworks Enterprise Version 5.7, Build 255 on **08/25/2006 at 2:28:00 PM by Ricardo I. Gilbert**

Vanessa L. Ramey, Lab Director
Lisa D. Ortiz, Department Manager
James W. Dillard, Product Manager
Ricardo I. Gilbert, Senior Analytical Chemist

This report contains sample results for the following samples, Login Reference File number: 06080013

Sample ID	Field ID
AG47628	WBF-SLAG
AG47629	WBF-GP4
AG47630	WBF-GP5
AG47631	WBF-GP7
AG47632	WBF-SURFACE

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Watts Bar Fossil Plant

Chemical Pond Sediment Lab Testing

Data Report Number: 060713-170215
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801

Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: S.C. Williams
WBF 1A-WBN
Phone: 423-365-8157
Fax : Not Available
E-Mail: WBF Environmental; EDM

Location Code: WBF

Field ID: WBFCP-1-06

Sample Description: CHEM POND SEDIMENT COMPOSITE

Sample ID: AG41667 **LRF ID:** 06070018
Matrix: Waste
Date Collected: 06/30/2006
Time Collected: 9:00 EST
Date Received: 06/30/2006
Time Received: 13:33
Project Manager: Ricardo I. Gilbert

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Arsenic, TCLP Extract	7440-38-2	< MDL	mg/L	0.1	07/12/2006	13:47	LMJ	EPA 6010B
Barium, TCLP Extract	7440-39-3	0.92	mg/L	0.01	07/12/2006	13:47	LMJ	EPA 6010B
Cadmium, TCLP Extract	7440-43-9	< MDL	mg/L	0.005	07/12/2006	13:47	LMJ	EPA 6010B
Chromium, TCLP Extract	7440-47-3	< MDL	mg/L	0.05	07/12/2006	13:47	LMJ	EPA 6010B
Lead, TCLP Extract	7439-92-1	< MDL	mg/L	0.05	07/12/2006	13:47	LMJ	EPA 6010B
Selenium, TCLP Extract	7782-49-2	< MDL	mg/L	0.1	07/12/2006	13:47	LMJ	EPA 6010B
Silver, TCLP Extract	7440-22-4	< MDL	mg/L	0.01	07/12/2006	13:47	LMJ	EPA 6010B
Mercury , TCLP Extract	7439-97-6	< MDL	mg/L	0.002	07/07/2006	14:46	WMG	EPA 7470

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Central Laboratories Services data report number 060713-170215 was electronically approved using Labworks Enterprise Version 5.7, Build 255 on **07/13/2006 at 4:51:00 PM by Ricardo I. Gilbert**

Vanessa L. Ramey, Lab Director
Lisa D. Ortiz, Department Manager
James W. Dillard, Product Manager
Ricardo I. Gilbert, Senior Analytical Chemist

This report contains sample results for the following samples, Login Reference File number: 06070018

Sample ID	Field ID
AG41667	WBFCP-1-06

07/13/2006
[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

TABLE C-2
Index Property and Additional Moisture-Density Test Results of Representative Soils - "MH" and "ML"
TVA Watts Bar Borrow Area - Slag Disposal Area Closure
MACTEC Project 3043061035/01

			Atterberg Limits					Compaction Tests			
Test Location Number	Sample Depth (Feet)	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Percent Finer Than No. 200 Sieve	USCS Classification	Standard Proctor Max. Dry Density, pcf	Optimum Moisture Content, %	Modified Proctor Max. Dry Density, pcf	Optimum Moisture Content, %
OT-1	3.0 - 4.0	32.3	67	41	26	87.5	MH	88.0	30.8	102.0	20.6
OT-1	8.0 - 10.0	18.6	41	31	10	55.5	ML	101.2	20.9	112.0	17.0

Prepared/Date: CTJ 12/14/06
Checked/Date: SDS 3/8/07

APPENDIX H OF
CLOSURE PLAN

T[redacted]C-3
Hydraulic Conductivity Test Results of "MH" Soil obtained from OT-1
TVA Watts Bar Borrow Area - Slag Disposal Area Closure
MACTEC Project 3043061035/01

Proctor	Point	Remolded Moisture (%)	Remolded Dry Density (pcf)	Hydraulic Conductivity (cm/sec)
Modified	1	15.7	100.3	2.8×10^{-7}
	2	18.9	101.9	4.5×10^{-8}
	3	21.0	101.7	4.3×10^{-8}
	4	27.3	97.8	1.5×10^{-8}
	5	28.5	92.8	2.6×10^{-8}
Standard	1	24.2	82.6	8.8×10^{-7}
	2	28.1	86.5	9.5×10^{-8}
	3	30.4	88.5	6.7×10^{-8}
	4	32.9	86.5	2.6×10^{-7}
	5	34.2	86.5	2.8×10^{-8}

Note: "MH" soil samples obtained from OT-1 at depths of 3.0 to 4.0 feet.

Prepared By: CTJ 03/28/06
Checked By: SDS 3/8/07

Table C-4
Hydraulic Conductivity Test Results of "ML" Soil obtained from OT-1
TVA Watts Bar Borrow Area - Slag Disposal Area Closure
MACTEC Project 3043061035/01

Proctor	Point	Remolded Moisture (%)	Remolded Dry Density (pcf)	Hydraulic Conductivity (cm/sec)
Modified	1	10.9	107.2	2.1×10^{-7}
	2	13.9	109.1	2.5×10^{-8}
	3	18.8	111.9	6.0×10^{-8}
	4	18.7	104.6	4.9×10^{-8}
	5	20.2	104.4	7.6×10^{-8}
Standard	1	15.0	92.4	4.7×10^{-8}
	2	18.1	96.9	4.7×10^{-8}
	3	20.3	102.1	2.8×10^{-8}
	4	27.1	93.5	8.4×10^{-8}
	5	38.6	83.2	3.7×10^{-8}

Note: "ML" soil samples obtained from OT-1 at depths of 8.0 to 10 feet

Prepared By: CTJ 03/02/07
Checked By: SDS 03/8/07

Soil Classification Type "MH" - Orange Brown and Yellow Brown elastic SILT

COMPACTION DATA POINTS SHOWING ACCEPTABLE ZONE OF HYDRAULIC CONDUCTIVITY FOR "MH" SOIL FROM OT-1

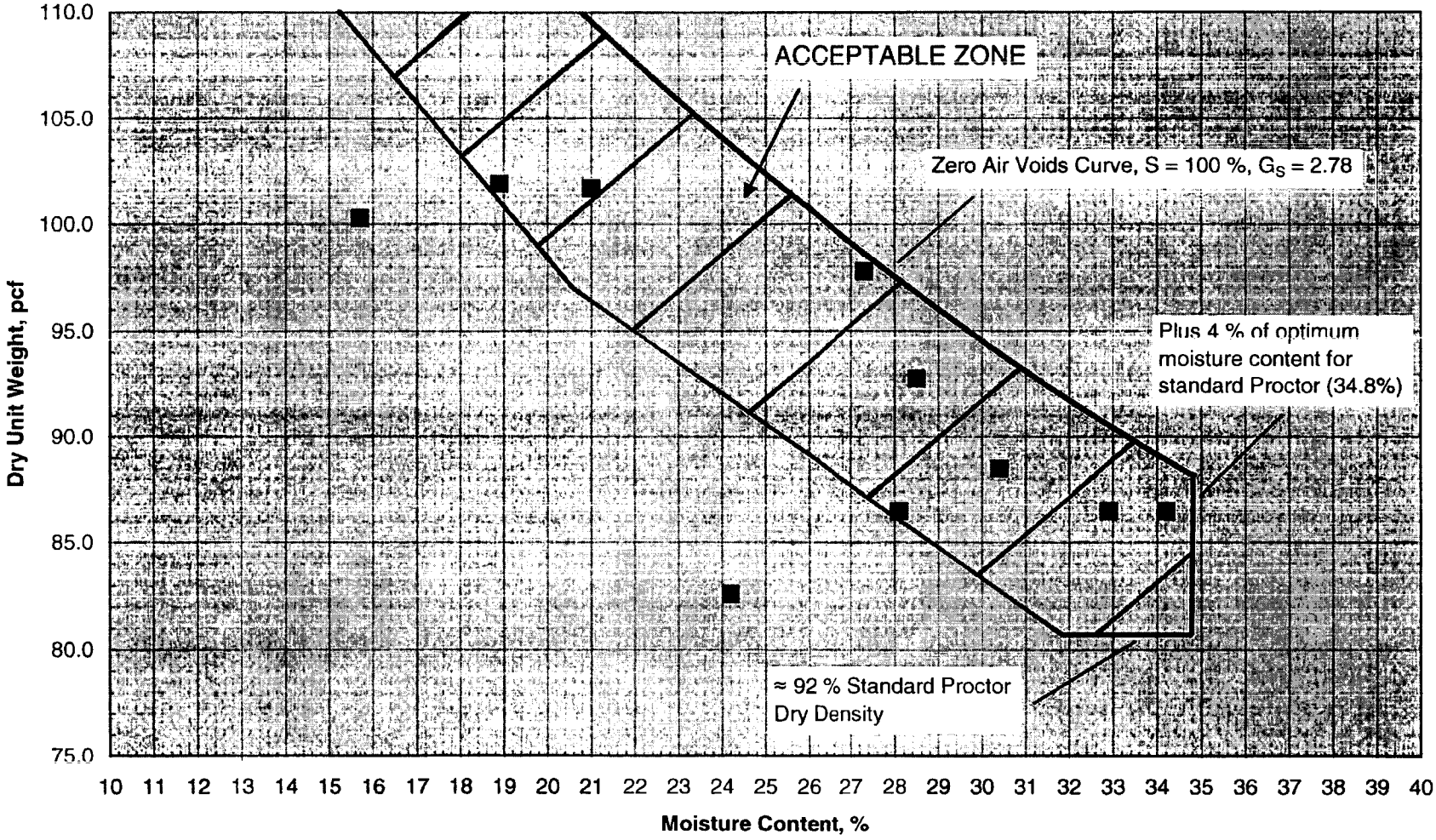

Figure 5- Compaction Data for "MH" Soil from OT-1 - Solid symbols are for compacted specimens with a hydraulic conductivity < 1 x 10^{-6} cm/s and open symbols for specimens with a hydraulic conductivity > 1 x 10^{-6} cm/s.

Soil ClassificationType "ML" - Light Orange Brown and Light Gray Sandy SILT

COMPACTION DATA POINTS SHOWING ACCEPTABLE ZONE OF HYDRAULIC CONDUCTIVITY FOR "ML" SOIL FROM OT-1

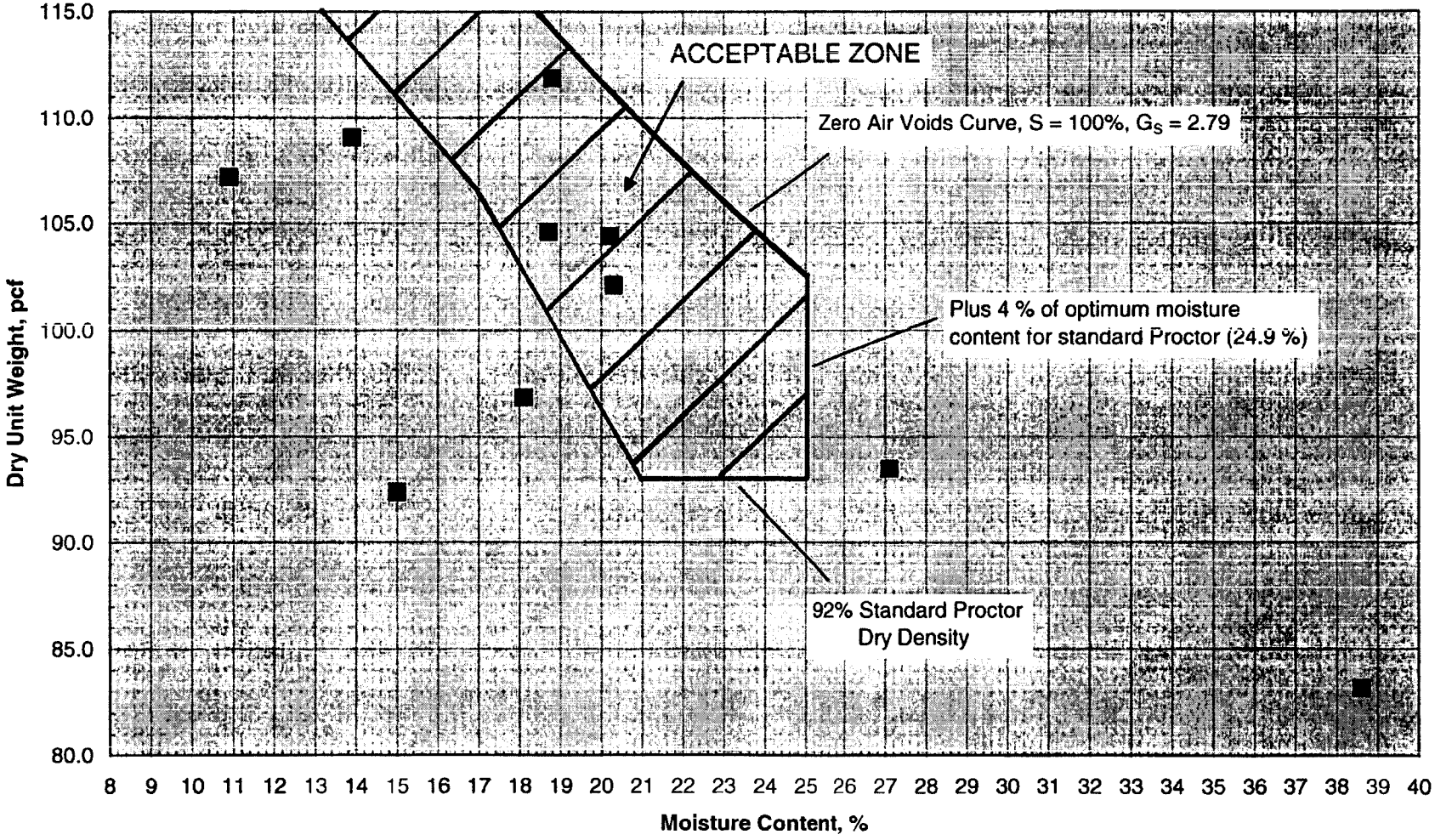

Figure 6- Compaction Data for "ML" Soil from OT-1 - Solid symbols are for compacted specimens with a hydraulic conductivity < 1 x 10^{-6} cm/s and open symbols for specimens with a hydraulic conductivity > 1 x 10^{-6} cm/s.