Attachment 1

Curve Number and Runoff Calculations
Curve Number and Runoff Calculations Worksheet

1- Areas
Areas were measured from the INTEC Title Page Drawing. See Attached.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEC Total Area</td>
<td>6,439,000 SF</td>
</tr>
<tr>
<td>TANK FARM AREA</td>
<td>634,000 SF</td>
</tr>
</tbody>
</table>

INTEC FACILITY (Not Including Tank Farm Area) (A2)

| Total Area | 5,805,000 SF |

<table>
<thead>
<tr>
<th>Impermeable Areas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Area</td>
<td>817,778 SF</td>
</tr>
<tr>
<td>Sidewalk Area</td>
<td>125,808 SF</td>
</tr>
<tr>
<td>Paved Area</td>
<td>786,604 SF</td>
</tr>
<tr>
<td>Total</td>
<td>1,576,000 SF</td>
</tr>
</tbody>
</table>

Total Permeable Area = 5,805,000 SF - 1,576,000 SF = 4,229,000 SF

2- Curve Numbers (CN)

TANK FARM AREA = 98

INTEC FACILITY (Not Including Tank Farm Area)

| Permeable Area CN | 77 |
| Impermeable Area CN | 98 |

Composite CN = (77 x 4,229,000 + 98 x 1,576,000) / 5,805,000 = 827

3- Precipitation
The amount of precipitation used for sizing the evaporation pond is based on the 25-yr snowmelt event. This is shown in Figure 7 and is the second largest snowmelt event shown in Figure 5.

26 in

4- Runoff Volume

TANK FARM AREA

| Potential Maximum retention after runoff begins | 0.20 inches |
| Runoff (inches) | Q = (P-0.2S)/P+0.8S | 2.57 in |
| Runoff Volume = QA = 138,000 Cu. Ft |

INTEC FACILITY (Not Including Tank Farm Area)

| Potential Maximum retention after runoff begins | 2.09 inches |
| Runoff (inches) | Q = (P-0.2S)/P+0.8S | 1.27 in |
| Runoff Volume = QA = 614,000 Cu. Ft |

TOTAL RUNOFF VOLUME = 750,000 Cu. Ft
Attachment 2

Rip-rap Sizing Calculations
SIZE RIP-RAP

DESIGN SHEAR STRESS: \( \tau_d = \tau_0 d S \)

where:
\( \tau_0 = 62.4 \text{ lb/ft}^3 \)
\( d = 1.3\text{ ft} \)
\( S = 0.002 \text{ ft/ft} \)

\( \tau_d = \frac{62.4 \text{ lb}}{\text{ft}^3} (1.3 \text{ ft}) (0.002 \text{ ft/ft}) = 0.17 \text{ lb/ft}^2 \)

ALLOWABLE SHEAR STRESS, FROM CHART 3.

FOR 1" DIA. RIP-RAP, \( \tau_{all} = 0.38 \text{ lb/ft}^2 \)

\( \tau_d < \tau_{all} \quad \therefore \text{OK} \)

SPECIFY 4" TO 6" DIA RIP-RAP
**SPILLWAY CULVERT CAPACITY**

![Diagram of spillway culvert]

- **L** = 62 LF
- **S** = 0.002
- **K** = 0.9
- **n** = 0.024
- **A** = \( \frac{\pi}{4} \times 2^2 = 3.14 \)
- **R** = \( \frac{D}{4} = \frac{2}{4} = 0.5 \) ft

**Head Loss:**

\[
H_L = \left( K + \frac{29n^2L}{R^{5/8}} + 1 \right) \frac{V^2}{2g} = h
\]

AND HEADWATER DEPTH

\[
H_w = H_L + T_w - S_w L \quad \text{or} \quad H_L = 4 - 2 + 1.24 = 2.124
\]

2.124 = \( \left( 1.9 + \frac{29(0.024)^2 (0.2)}{(0.5)^{5/8}} \right) \frac{V^2}{2g} \)

- **V** = 5.51 fps
- **Q** = 5.51 \times 3.14 = 17.3 cfs

**Total Discharge:** 34.6 cfs
### Project Description

- **Project File**: `d:\job files\intec\tank farm interim action\tf inter.fm2`
- **Worksheet**: Pond Discharge Channel
- **Flow Element**: Trapezoidal Channel
- **Method**: Manning’s Formula
- **Solve For**: Channel Depth

### Input Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mannings Coefficient</td>
<td>0.035</td>
</tr>
<tr>
<td>Channel Slope</td>
<td>0.002000 ft/ft</td>
</tr>
<tr>
<td>Left Side Slope</td>
<td>2.000000 H : V</td>
</tr>
<tr>
<td>Right Side Slope</td>
<td>2.000000 H : V</td>
</tr>
<tr>
<td>Bottom Width</td>
<td>10.00 ft</td>
</tr>
<tr>
<td>Discharge</td>
<td>34.60 cfs</td>
</tr>
</tbody>
</table>

### Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>1.36 ft</td>
</tr>
<tr>
<td>Flow Area</td>
<td>17.34 ft²</td>
</tr>
<tr>
<td>Wetted Perimeter</td>
<td>16.09 ft</td>
</tr>
<tr>
<td>Top Width</td>
<td>15.45 ft</td>
</tr>
<tr>
<td>Critical Depth</td>
<td>0.69 ft</td>
</tr>
<tr>
<td>Critical Slope</td>
<td>0.021740 ft/ft</td>
</tr>
<tr>
<td>Velocity</td>
<td>2.00 ft/s</td>
</tr>
<tr>
<td>Velocity Head</td>
<td>0.06 ft</td>
</tr>
<tr>
<td>Specific Energy</td>
<td>1.42 ft</td>
</tr>
<tr>
<td>Froude Number</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Flow is subcritical.
Design of Channel and Streambank Stabilization

Chart 3: Permissible Shear Stress for Non-cohesive Soils (From HEC-15)
INTEROFFICE MEMORANDUM

Date: October 27, 1999

To: R. Lee Davison 526-3770

From: Peggy J. Jessmore 526-9367

Subject: SAFETY ANALYSIS AND UNRESOLVED SAFETY QUESTION – OPERABLE UNIT (OU) 3-13 TANK FARM INTERIM ACTION, PHASE 1 – PJJ-01-99

Attached are the approvals for the Request for Determination of Safety Analysis Requirements, and the Unresolved Safety Question Safety Evaluation Screening for Facility Modifications for Phase 1 of the OU 3-13 Interim Action. Please place these in the OU 3-13 project files. If the scope of Phase 1 is modified to include changes to the tank farm structures or soil shielding above the tanks within the INTEC tank farm fence, these documents will need to be re-evaluated.

PJJ

Attachment

cc: Robert E. James, MS 3953
ARDC File, MS 3922
Peggy J. Jessmore Letter File
REQUEST FOR DETERMINATION OF
SAFETY ANALYSIS REQUIREMENTS

Date: 10/13/99

A. To Be Completed by Project Manager, Project Management Department

1. Project OU 3-13 Phase I Tank Farm Interim Action

Project Manager Randy L. Davison Mail Stop 3953

Type: □ Line Item □ GPP □ CE □ Work Order □ Other

2. Reference Documents Submitted:

Check the documents submitted with this request:
- Technical Functional Requirements
- Feasibility Studies
- Design Criteria
- Project Plan
- Conceptual Design Report
- Work Order
- Environmental Evaluation or EIS
- Engineering Change Form
- USQ Screening
- Other

B. To Be Completed by the Cognizant Safety Analysis Organization

Task Number

1. New Facility Project:

PSAR required before facility construction?
Yes ☒ No

New SAR or revision/addendum to an existing SAR required before operation?
Yes ☒ No

Will this be a nuclear facility (see MCP-2448)?
Yes ☒ No

2. Existing Facility Modifications:

USQ evaluation required?
Yes ☒ No

Revision/addendum to an existing SAR required?
Yes ☒ No

Descriptive changes to an existing SAR required?
Yes ☒ No

Hazard category/classification

Tank Farm area is Hazard Cat 2 facility

3. Justification for Items B.1 - B.2:

This project will not change or modify the tank farm structures or soil shielding above the tanks. All heavy equipment usage on or around the tank farm area must be in compliance with the requirements of TS 4.2B14 for load controls. Safety analysis or safety document revisions are not required for this project.

4. Proposed schedule for Company and DOE approvals of required Safety Analysis:
Not applicable

Request for Safety Analysis Approval

E. E. Hochhalter Manager, Safety Analysis Unit/Department
Print/Type Name

Manager, Safety Analysis Unit/Department
Signature

Date 10/15/99

Distribution: Copy for Project Manager; original and one copy to Safety Analysis. Original back to Project Manager when Safety Analysis determination is completed.
The OU 3-13 Interim Action Phase I scope of work includes upgrading existing surface and building drainages, installing new drainage ditches, and constructing new storm water collection ponds at INTEC. The objective in performing this work is to direct/control precipitation run-on away from the tank farm area, as mandated in the Record of Decision. Upgrading existing surface drainages consists of removing the existing rock currently lining the ditches, adding sub base and concrete linings. Upgrading existing building drainages consists of upgrading, adding or redirecting existing rain gutters away from the tank farm area. Excavation, and addition of sub base and concrete lining will be required for the new drainage ditches. New culverts and a new fence will also be installed at various project locations. All drainage ditches will be routed to the new storm water collection ponds, constructed outside the INTEC facility fence. Construction of these ponds requires excavation, dirt moving, and compaction, using heavy equipment. This field work is scheduled to begin in August 2000 and end in January 2001.
USQ SAFETY EVALUATION SCREENING
FOR FACILITY MODIFICATIONS

Nuclear Facility or Activity: Tank Farm
USQ Determination No.: USQ - 4.2 - 007S
Title of Proposed Modification: OU 3-13 Phase I Tank Farm Interim Action

Describe the Proposed Modification and its potential effects:
The OU 3-13 Interim Action Phase I scope of work includes upgrading existing surface and building drainages, installing new drainage ditches, and constructing new storm water collection ponds at INTEC. The objective in performing this work is to control precipitation run-off away from the tank farm area, as mandated in the Record of Decision. Upgrading existing surface drainages consists of removing the existing rock currently lining the ditches, adding sub base and concrete linings. Upgrading existing building drainages consists of adding or redirecting existing rain gutters away from the tank farm area. Excavation and addition of sub base and concrete lining will be required for the new drainage ditches. New culverts and a new fence will also be installed at various project locations. All drainage ditches will be routed to the new storm water collection ponds, constructed outside the INTEC facility fence. Construction of these ponds requires excavation, dirt moving, and compaction, using heavy equipment. This field work is scheduled to begin in August 2000 and end in January 2001.

List the reference location(s) of safety requirement(s) in the authorization basis or any Technical Safety Requirement (TSR) related to the Proposed Modification:
PSD 4.2, "Aqueous Liquid Waste Management"
Associated 4.2 series of TS/Ss

ISQ Screening:

Could the change adversely affect the safety function of a structure, system, or component (SSC) or part of a larger SSC described in the authorization basis? Consider the following specific possibilities as a minimum.

1. Could the operability or effectiveness of instrumentation important to safety be degraded? □ YES □ NO
2. Could the change adversely affect the ability or a shielding structure to mitigate the consequences of a criticality accident of other major radiation incident? □ YES □ NO
3. Could the change adversely affect an HVAC exhaust air filtration system in controlling airborne radioactivity releases to the environment or in mitigating the consequences of an accident? □ YES □ NO
4. Could the change adversely affect the integrity of a fuel storage rack or storage fixture? □ YES □ NO
5. Could the change result in a criticality scenario different from those considered in the authorization basis (for example, different assembly mechanism, composition or configuration of a postulated critical array)? □ YES □ NO
6. Could a plant protection system be adversely affected? □ YES □ NO
7. Could the change adversely affect a safety class or safety significant design feature, an engineered safety feature (ESF), or other equipment important to safety? □ YES □ NO
8. Could construction-related activities adversely affect a safety function? □ YES □ NO

The answer to any of questions 1 through 8 above is "Yes", a USQ safety evaluation must be performed and documented on Form 431.20, USQ Safety Evaluation, or equivalent (see MCP-123).

Provide an explanation of the screening results below:
This project is upgrading the existing surface and building drainages, installing new drainage ditches, and constructing new storm water collections ponds at INTEC. All work around the tank farm area using heavy equipment must be performed within the load restrictions identified in TS4.2B14.

E. E. Hochhalter
USQ Screener
(Type Name)

E. E. Hochhalter
USQ Screener
(Signature)

10/25/99
Date
REQUEST FOR DETERMINATION OF
SAFETY ANALYSIS REQUIREMENTS

Date: 01/26/00

A. To Be Completed by Project Manager, Project Management Department

1. Project OU 3-13 Phase 2 Tank Farm Interim Action

   Project Manager: R. Lee Davison
   Type: [ ] Line Item [ ] GPP [ ] CE [ ] WorkOrder [ ] Other

2. Reference Documents Submitted:
   Check the documents submitted with this request:
   [ ] Technical Functional Requirements [ ] Feasibility Studies
   [ ] Design Criteria [ ] Project Plan
   [ ] Conceptual Design Report [ ] Work Order
   [ ] Environmental Evaluation or EIS [ ] Engineering Change Form
   [ ] Other [ ] Work Scope Description

B. To Be Completed by the Cognizant Safety Analysis Organization

   Task Number

   1. New Facility Project:
      PSAR required before facility construction? [ ] Yes [ ] No
      New SAR or revision/addendum to an existing SAR required before operation? [ ] Yes [ ] No
      Will this be a nuclear facility (see MCP-2446)? [ ] Yes [ ] No

   2. Existing Facility Modifications:
      USQ evaluation required? [ ] Yes [ ] No
      Revision/addendum to an existing SAR required? [ ] Yes [ ] No
      Descriptive changes to an existing SAR required? [ ] Yes [ ] No
      Hazard category/classification: N/A

   3. Justification for Items B.1 - B.2:
      This project is performing a surface grading of the Tank Farm to create positive drainage. Safety analysis for this work is not required, provided the load limits on soil which thicknesses are not changed.

   4. Proposed schedule for Company and DOE approvals of required Safety Analysis: N/A

Request for Safety Analysis Approval

[Signature]

Distribution: Copy for Project Manager; original and one copy to Safety Analysis. Original back to Project Manager when Safety Analysis determination is completed.
The OU 3-13 Tank Farm Interim Action Phase 2 scope of work consists of the following:

- Surficial grading of the tank farm area (TFA) to create positive drainage. It is anticipated that current load restrictions will not be affected by the redistribution of soils during the grading process. This will be accomplished by redistributing equal volumes of cut and fill within the same zone, which is permissible and does not affect load limitations.

- Installation of two swales/ditches within the tank farm to direct water out of the TFA.

- Surface sealing the entire TFA with a polyurea spray on coating.

Penetration below the current liner is anticipated, but will be avoided where possible. A grading plan is currently in progress. It is anticipated that soil within the tank farm will remain in the tank farm, however, this may change depending on the results of the grading plan.
REQUEST FOR DETERMINATION OF
SAFETY ANALYSIS REQUIREMENTS

Date: 2-24-00

A. To Be Completed by Project Manager, Project Management Department

1. Project  INTEC Polyurea Demonstration

   Project Manager  Michelle Kaptein
   Mail Stop 3953

   Type:  ☐ Line Item  ☐ GPP  ☐ CE  ☐ WorkOrder  ☐ Other  ☑ Product demo.

2. Reference Documents Submitted:

   Check the documents submitted with this request:
   ☐ Technical Functional Requirements  ☐ Feasibility Studies
   ☐ Design Criteria  ☐ Project Plan
   ☐ Conceptual Design Report  ☐ WorkOrder
   ☐ Environmental Evaluation or EIS  ☐ Engineering Change Form
   ☐ USQ Screening  ☑ Other  ☑ Demonstration Plan

B. To Be Completed by the Cognizant Safety Analysis Organization

Task Number

1. New Facility Project:

   PSAR required before facility construction?  ☐ Yes  ☑ No
   New SAR or revision/addendum to an existing SAR required before operation?  ☑ Yes  ☑ No
   Will this be a nuclear facility (see MCP-2446)?  ☑ Yes  ☑ No

2. Existing Facility Modifications:

   USQ evaluation required?  ☑ Yes  ☑ No
   Revision/addendum to an existing SAR required?  ☑ Yes  ☑ No
   Descriptive changes to an existing SAR required?  ☑ Yes  ☑ No
   Hazard category/classification  N/A

3. Justification for Items B.1 - B.2:

   This is a demonstration project for application of a spray-on only urea product. This demonstration does not require safety analysis.

4. Proposed schedule for Company and DOE approvals of required Safety Analysis:

   N/A

Request for Safety Analysis Approval

E. E. Hochheiter  E. E. Hochheiter  3/20/00

Manager, Safety Analysis Unit/Department  Manager, Safety Analysis Unit/Department
Print/Type Name  Signature

Distribution: Copy for Project Manager; original and one copy to Safety Analysis. Original back to Project Manager when Safety Analysis determination is completed.
Describe the **Proposed Test/Experiment** and its potential effects:

A test area at INTEC will be sprayed with poly urea, which is a spray on applied impermeable product. This demonstration is required to determine product performance and bonding capabilities to various materials.

List the reference location(s) of safety requirement(s) in the authorization basis document(s) (i.e., SAR, BIO, TSRs, OSRs) related to the **Proposed Test/Experiment**:

INTEC Facility Specific SARs and Plant Safety Document Sections.

**USQ Screening:**

1. Could this test or experiment introduce conditions or materials other than those described in the authorization basis for the facility/activity?  
   - YES  
   - NO

2. Could the conduct of this test or experiment adversely affect approved margins of safety described in the authorization basis, either during normal operations or during anticipated or unlikely transients (abnormal conditions)?  
   - YES  
   - NO

3. Could the conduct of this test or experiment adversely affect the adequacy of structures, systems, or components (SSCs) intended to prevent or mitigate accidents?  
   - YES  
   - NO

4. Is this a post-modification test or experiment which was not considered in the USQ screening or safety evaluation for the modification?  
   - YES  
   - NO

If the answer to any of questions 1, 2, 3, or 4 above is Yes", a **USQ** safety evaluation must be performed and documented on Form 431.20, **USQ Safety Evaluation**, or equivalent (see MCP-123).

Provide an explanation of the screening results below:

This is a demonstration project that is testing a spray on product on the ground surface between TB-6 and the tank farm. This demonstration project does not impact the Tank Farm authorization basis, which is a nuclear facility.

---

**E. E. Hochhalter**  
USQ Screener  
(Typed Name)

**E. E. Hochhalter**  
USQ Screener  
(Signature)

**3/20/00**  
Date