ABQ09

CALCULATION COVER SHEET

Project:	**INEEL V-Tank Remediation Project**				**Number of Sheets:** 1 of 9
Site:	INEEL Test Area North, Idaho Falls, Idaho				
Calculation Number:	ABQ09 – CE005		**Work Order Number:**	12393.002.001	
Subject:	**HIC Storage/Drum Filling Staging Area Secondary Containment Requirements**				
	Date:	**Revision:**	**Calculated by:**	**Checked by:**	**Approved:**
RAA		60%	R. Ederer		
RAB	5/7/01	90%	R. Ederer	B. Keshian	B. Keshian
RAC	6/29/01	90% Polish	D. Brennecke	B. Keshian	B. Keshian
RAD	9/27/01	Draft Final	D. Brennecke	B. Keshian	Jim Lockhart
RAE	10/23/01	Draft Final Polish	D. Brennecke	B. Keshian	Jim Lockhart 10/24/01

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Problem Statement:

Estimate the secondary containment volume required for HIC storage area and determine area required for HICs and drum filling operation.

Assumptions:

- 9 ~ 9½' ϕ HIC will be needed.
- Estimated containment area from drawing

$$\approx 3500\ SF \times \frac{mi^2}{(5280\ ft)^2} = 0.000125\ mi^2$$

- Contain 100% volume of the largest container or 10% of total storage volume plus volume of 25 YR 24 HR storm per 40 CFR 264.175b3
- Largest container will be sludge HIC w/ 107.6 CF (805 gal) capacity

Sources and References

Design Drawings
Duratek product information
NOAA Precipitation atlas (25 YR/ 24 HR)
Bartlett Services, Art Derosiers

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Calculations:

storage volume = 9 HIC × 805 gals/HIC = 7245 gals
(968.5 CF)

containment volume = 10% × 7248 gal = 725 gal < 805 gal
∴ use 805 gal

Stormwater Volume:

$V = Q * Am \cdot 53.33$

$Cn = 79$

$S = 2.66$

$P_{25} = 2.0$

Am = Area in (miles)^2

$Am = 0.000125\ mi^2$

$$Q = \frac{(P_{25} - 0.2S)^2}{(P + 0.8S)} = 0.522$$

$$V = 0.522 \times 0.000125 \times 53.33$$
$$= 0.00348\ AC\text{-}FT \times 43{,}560\ \frac{SF}{AC}$$
$$= 152\ CF \times \frac{7.48\ gal}{CF}$$
$$= \underline{\underline{1137\ gal}} \leftarrow$$

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Containment Storage Volume Req'd

Tank + 25 YR 24 HR STORM

805 gal + 1137 gal = 1942 gal ←

Height of Berm Req'd

Assume flat bottom as shown on dwg

$$\text{Berm HT} = 1942\ \text{GAL} \times \frac{1}{3500\ \text{SF}} \times \frac{\text{CF}}{7.48} = 0.07' \times 12''/\text{FT}$$

$$= 0.89'' \leftarrow$$

0.89" < 12" BERM HEIGHT ∴ OK ←

DETERMINATION OF SLUDGE HIC STORAGE AREA REQUIRED

Item	Value	Units			
Tank diameter	10	feet			
Tank length	19.3	feet			
Sludge solid fraction	0.65				
Tank/sludge					
V-1	520	gallons	69	cubic feet	100
V-2	520	gallons	69	cubic feet	
V-3	653	gallons	87	cubic feet	
V-9	250	gallons	33	cubic feet	
Total	1943	gallons	259	cubic feet	
HIC capacity	54	cubic feet	(CNSI PL8-120 FP/FEDX at 55% capacity)		
Number of HICs	8		(One HIC needed for water polishing; sludges within individual tanks will not be mixed)		
HIC's diameter	5	feet	(CNSI PL8-120 FP/FEDX)		
Shield diameter	9.5	feet			
Required area/each	156	square feet			
Added logistics area	30%				
Area for HICS	1625	square feet			
Area for HIC-drum TX	1625	square feet			
Total area required for sludge HIC/Drum Filling	**3250**	**square feet**			

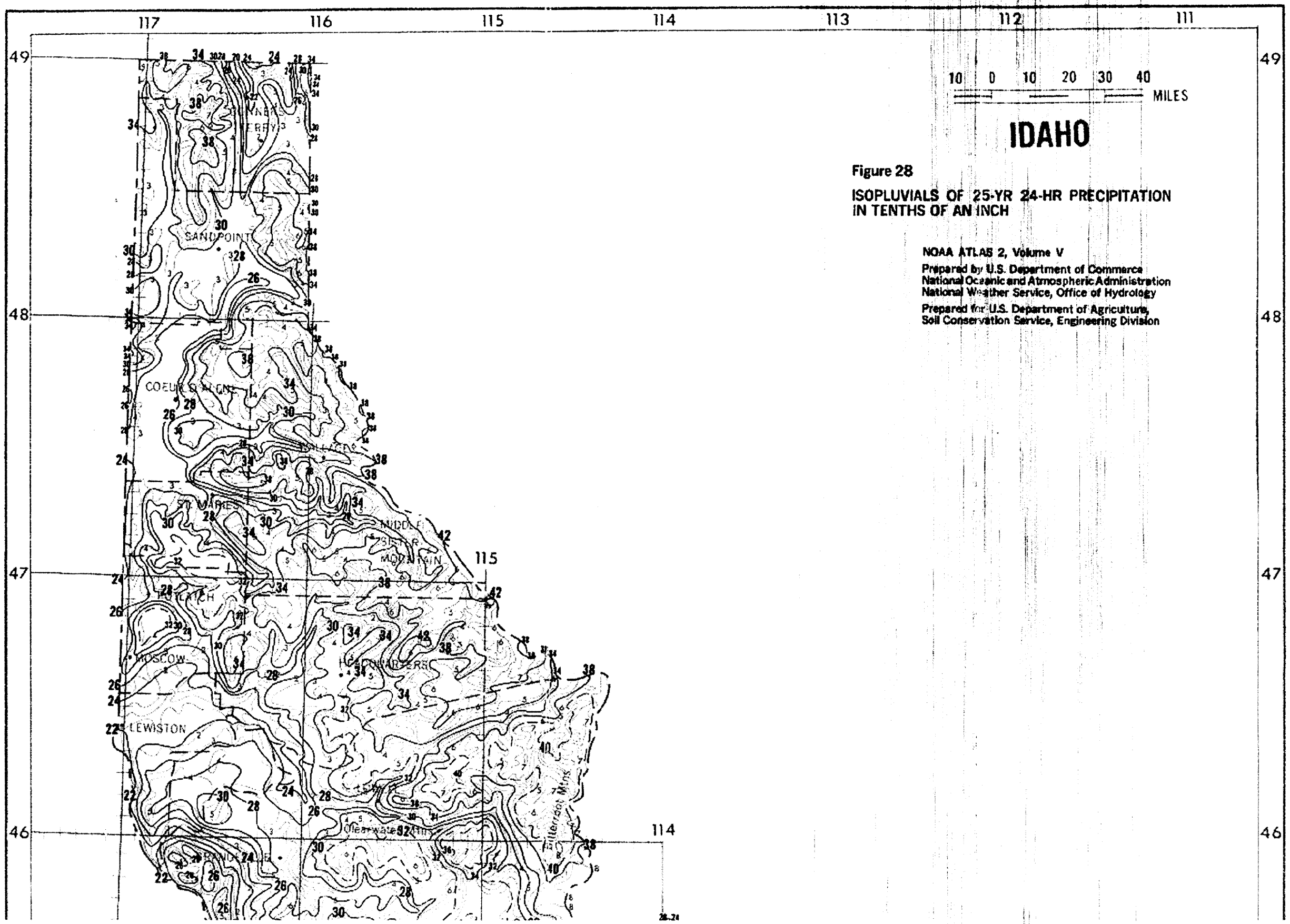


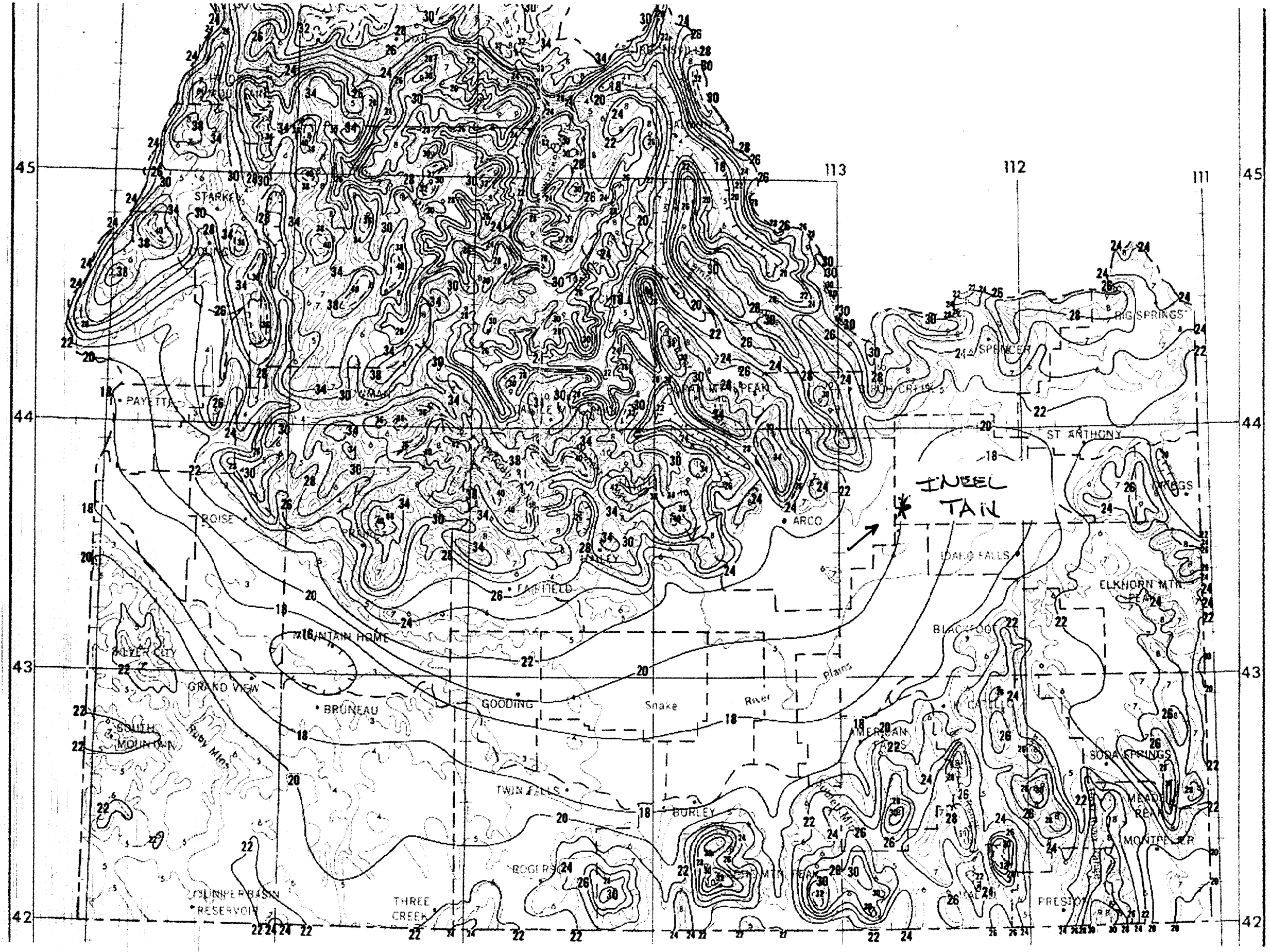
Figure 28

ISOPLUVIALS OF 25-YR 24-HR PRECIPITATION IN TENTHS OF AN INCH

NOAA ATLAS 2, Volume V

Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Department of Agriculture,
Soil Conservation Service, Engineering Division


45
44
43
42
113
112
111
STARKEY
PAYETTE
ROISE
FAIRFIELD
MOUNTAIN HOME
GRAND VIEW
BRUNEAU
GOODING
Snake
River
Plains
TWIN FALLS
BURLEY
ROGERS
THREE CREEK
ARCO
IDAHO FALLS
BLACKFOOT
AMERICAN
SPENCER
BIG SPRINGS
ST ANTHONY
RIGGS
ELKHORN MTN
SODA SPRINGS
MONTPELIER
FRESTON
INEEL
TAN

Duratek

Table 3 Duratek Polyethylene HICs Dimensions and Volumes					
Empty Size/Type Polyethylene HICs	Weight (Lbs.)	Height (In.)	Diameter (in.)	Internal Usable Vol. (cu ft.)	Disposal Volume
PL6-80 MT	500	56.5	57	73.3	83.4
PL6-80 MTIF	525	56.5	57	64.1	83.4
PL6-80 FR	550	56.5	57	73.3	83.4
PL6-80 FP/FEDX	625	56.5	57	73.3	83.4
PL8-120 MT	600	73.5	60	107.6	120.3
PL8-120 MTIF	625	73.5	60	95.8	120.3
PL8-120 FR	650	73.5	60	107.6	120.3
PL8-120 FP/FEDX	725	73.5	60	107.6	120.3
PL14-170 MT	800	71.5	72.5	150.3	170.8
PL14-170 MTIF	850	71.5	72.5	134.9	170.8
PL14-170 FR	850	71.5	72.5	150.3	170.8
PL14-170 FP/FEDX	1,000	71.5	72.5	150.3	170.8
PL14-195 MT	850	78	74	171.4	194.1
PL14-195 MTIF	900	78	74	154.6	194.1
PL14-195 FR	900	78	74	171.4	194.1
PL14-195 FP/FEDX	1,050	78	74	171.4	194.1
PL14-215 MT	1,200	78.375	76	189.2	205.8
PL14-215 MTIF	1,250	78.375	76	171.7	205.8
PL14-215 FR	1,250	78.375	76	189.2	205.8
PL14-215 FP/FEDX	1,400	78.375	76	189.2	205.8
PL21-300 MT	1,100	108	80	285.1	314.2
PL21-300 MTIF	1,175	108	80	262.1	314.2
PL21-300 FR	1,150	108	80	285.1	314.2
PL21-300 FP/FEDX	1,350	108	80	285.1	314.2