LOFT DEMOLITION COMPLETION REPORT

December 2006

Idaho Cleanup Project

The Idaho Cleanup Project is operated for the
U.S. Department of Energy by CH2M • WG Idaho, LLC

RPT-312
Project No. xxx

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December 2006

Idaho Cleanup Project

Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
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12-14-06
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12/14/06
Date

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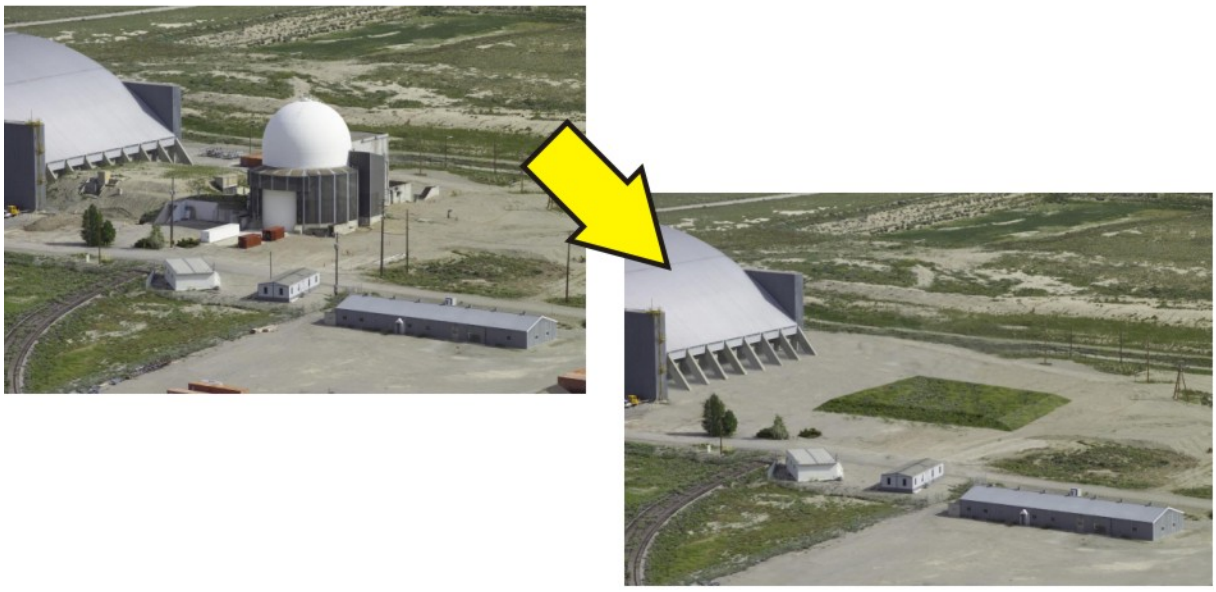
Date

ABSTRACT

The LOFT Demolition Completion Report has been prepared to describe the overall implementation of the project sequence for the demolition of TAN-630, TAN-650, and the adjacent Containment Vessel. The sequence of activities presented in The LOFT Demolition Plan (PLN-2096) supported the preferred alternative chosen in the agency approved EE/CA. The management resources, interfacing support organizations, equipment, and contracting methods that were employed are described. Lessons learned, best management practices, and slight deviations from original plans are presented along with photographic documentation of all the demolition activities.

Preparation and three phases of demolition are described with progress photographs showing the areas affected by the activities. The actual sequence for the demolition of the facility generally followed the plan used, but flexibility was allowed to account for changing conditions and available trained crew and available equipment to take the previously deactivated state of the facility to closure.

Test Area North/LOFT Before and After Cleanup



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CONTENTS

FIGURES

ACRONYMS

EE/CA	Engineering evaluation/cost analysis
ICDF	Idaho CERCLA Disposal Facility
INL	Idaho National Laboratory
LOFT	Loss-of-Fluid Test
TAN	Test Area North

1. INTRODUCTION

The Loss-of-Fluid Test (LOFT) area is located on the Idaho National Laboratory (INL) Site at the west end of the Test Area North (TAN). The LOFT reactor was part of the Mobile Test Assembly mounted on a special designed railroad flatcar located inside the domed Containment vessel. Systems for operating the reactor were located inside structures immediately adjacent to the Containment Vessel. The LOFT facility was used to perform loss of coolant experiments that simulated loss of coolant accidents as part of the nation's power water reactor program

The LOFT Demolition Completion Report has been prepared to describe the overall approach and project sequence for the demolition of TAN-630, TAN-650, and the adjacent Containment Vessel. The management resources, interfacing support organizations, equipment, and contracting strategy that were employed are described.

The approach used for demolishing LOFT, which was previously deactivated, included performing tasks at multiple locations/levels in phases. A phase of preparation was by followed by three demolition phases. The preparation phase was constrained by the pending regulatory determination of proposed alternatives. The demolition phases were sequenced such that access to difficult areas could be achieved in the process with overall productivity maintained. The demolition activities started in April of 2006 and were completed by the end of 2006.

Demolition was performed in the safest, most efficient sequence possible. Work Control Packages defined the specific work activities. The sequence in the demolition plan was general to allow flexibility. When unexpected circumstances were encountered, approaches were reevaluated, and altered with management approval and documented by entries in the work order status log with appropriate approvals or work order changes.

2. ORGANIZATION

LOFT Demolition was accomplished by the LOFT D&D organizational team. Oversight was performed by TAN D&D management with support from interdisciplinary subject matter experts.

3. SUPPORT INTERFACE

The field activities required support organizations working closely with the D&D crews:

- Radiological Control Technicians
- Environmental Project Support
- Regulatory affairs (DOE-ID, DEQ, EPA)
- Health and Safety representatives
- Waste Generator Services
- TAN Demolition Landfill
- Idaho CERCLA Disposal Facility (ICDF) Landfill
- Central Facilities Area Excess Yard and Landfill.

4. EQUIPMENT

The equipment used for the activities included:

- Excavators with hammer and processor attachments
- Front end Loaders
- Dozers
- Articulating Dump trucks
- Cranes
- Aerial Lifts
- Water trucks
- Grader
- Oxy/propane cutting torches and lances
- Linear shaped explosive charges
- Other small equipment to access difficult areas.

5. CONTRACTING STRATEGY

The majority of all preparation and demolition activities were performed by CWI TAN D&D crews. Subcontractors were used to clean fuel oil tanks, for grout and pumping of grout, and concrete saw cutting SMC tunnels. D&D crews were assisted by Force Account Labor for special individual tasks such as isolating tunnels to SMC, constructing a new haul road to the TAN Landfill, final cover installation, and temporary trailer setup. A Subcontractor team, SEC-DEMCO-CDI, was used for crippling, explosive and conventional demolition of the Containment Vessel. The Subcontractor reduced the size of the CV while D&D crews packaged the containment vessel pieces for transport and disposal at ICDF and the TAN landfill.

6. OVERALL LOFT DEMOLITION APPROACH

The demolition approach included performing tasks at multiple locations/levels in designated Phases. A phase of preparation was followed by three demolition phases. Review and final approval of the engineering evaluation/cost analysis (EE/CA) preferred alternative determined the waste disposal path. Waste from this project went to the TAN Demolition Landfill if it met the standards of Table 2-2 of the Rad Con Manuel and to ICDF if radiological contaminated. Clean asbestos material was disposed in the CFA Landfill.

The areas that were affected by the preparation and three demolition phases (Phase I –Single story and below grade 630/650 structures, Phase II – Multi-story 650 structure, Phase-III – Containment Vessel).

7. PREPARATION ACTIVITIES

During EE/CA review

Decon and Equipment Removal
Clean and Grout TAN-767 A & B, and TAN-766
Remove shielding soil from TAN-630, TAN-650, and Room 219 and stage
Close Tunnels to SMC
Electrical Isolation confirmation from SMC
Build access road to tunnel on east side of TAN-650
Cut free light mechanical equip stage in facility or remove thru tunnel
Remove north-west hatch TAN-650 and remove equipment through hatch
Remove boilers, and prepare generator, borated water tank and other large equipment for removal
Remove CV Off-gas (east side)

Post EE/CA review

Historical Equipment removal and for storage or disposal recycle

8. DEMOLITION ACTIVITIES

Phase I –Single story (and below grade 630/650/CV Areas)

Process TAN-630 structure
Process TAN-650 single level structures, and 650 basement areas around CV and dispose
Backfill areas to proper grade as needed
Construct soil ramp to access upper structure
Remove equipment and piping
Complete SMC tunnel opening closures
Fill CV annulus, lower CV, and sumps with inert material

Phase II – Multi-story 650 structure

Remove roof, north and east cinder block walls top level to access borated water tank
Remove borated tank from TAN-650 top level
Process and dispose package remaining structure, equipment, and piping
Backfill remaining areas to grade as needed
Take down 650 and isolate Containment Vessel

Phase-III – Containment Vessel Structure

Take down CV and polar crane
Remove CV Door weather cover
Remove CV RR Door
Process, segregate and package CV material for disposal and dispose
Backfill remaining areas to grade
Construct final cover over CV area

Photographic depictions of the preparation and demolition activities from start to finish are presented below.

Figure 1. Remove shielding soil from TAN-630, TAN-650, and Room 219 and stage.

Figure 2. Build access road to tunnel on east side of TAN-650.

Figure 3. Remove boilers, and generator, borated water tank, and other large equipment.

Figure 4. Remove CV Off-gas (east side).

Figure 5. Process TAN-630 structure to three feet before grade.

Figure 6. Process TAN-650 single level structures and -650 basement areas around CV to three feet before grade and dispose.

Figure 7. Backfill areas to proper grade as needed.

Figure 8. Construct soil ramp to access upper structure.

Figure 9. Remove equipment and piping.

Figure 10. Complete SMC tunnel opening closures.

Figure 11. Fill lower CV, and sumps with inert material.

Figure 12. Fill CV annulus with grout.

Figure 13. Remove roof, north and east cinder block walls top level to access borated water tank.

Figure 14. Remove borated tank from TAN-650 top level.

Figure 15. Process, package and dispose remaining structure, equipment, and piping.

Figure 16. Backfill remaining areas to grade as needed.

Figure 17. Remove Containment Vessel Dome and remove polar crane.

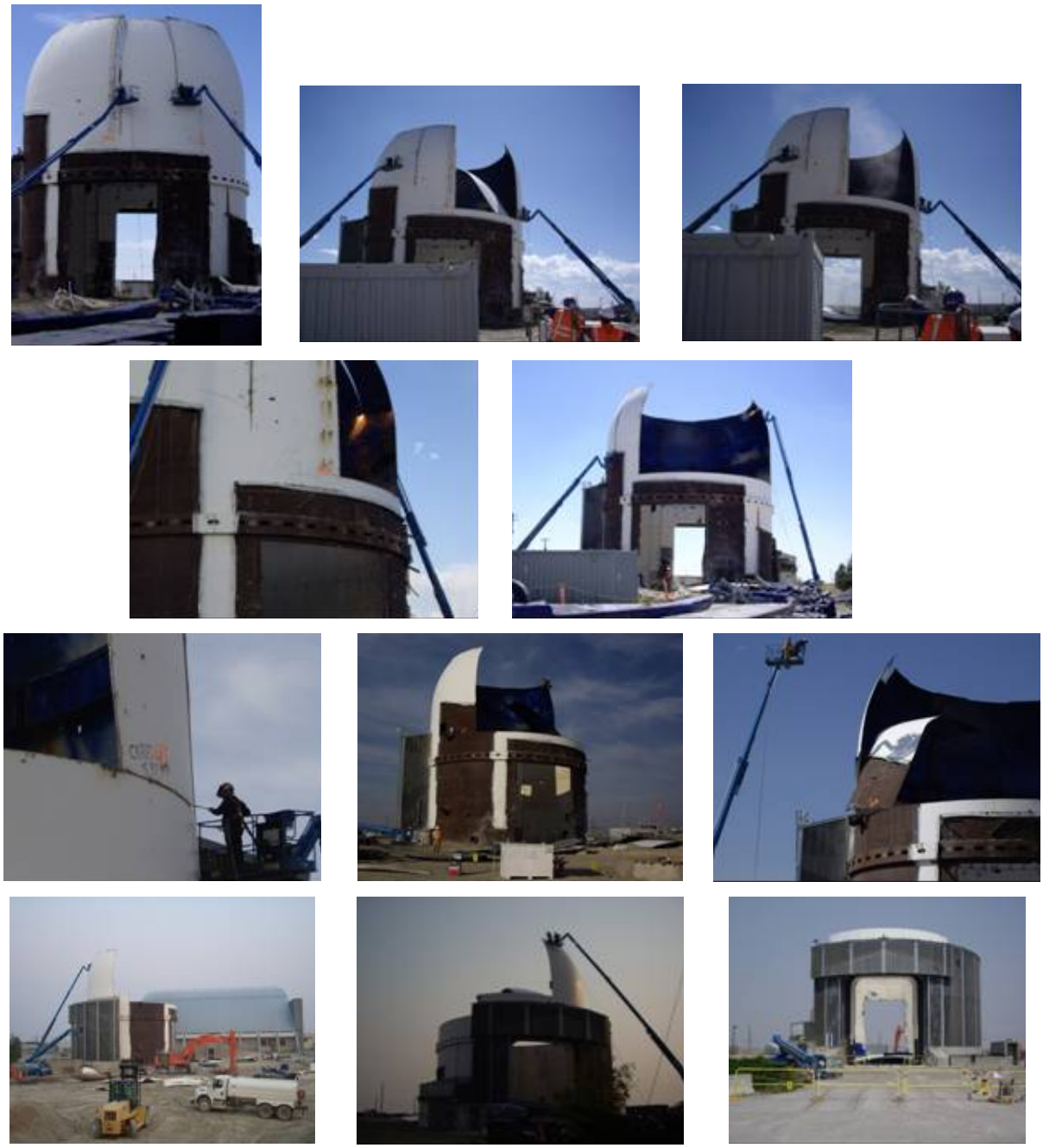

Figure 18. Demolish Containment Vessel.

Figure 19. Remove CV Door weather cover.

Figure 20. Remove CV RR Door.

Figure 21. Process, segregate and package CV material for disposal and dispose.

Figure 22. Backfill remaining areas to grade.

Figure 23. Construct final cover over CV area.

9. LESSONS LEARNED

A number of important lessons were learned during the execution of this successful project. The positives and negatives will be listed under categories: D&D of TAN-630 and TAN-650 with resident crews, Subcontractor Demolition of the LOFT Containment Vessel, and the disposition of the generated waste.

9.1 D&D of TAN-630 and TAN-650

Having a qualified team of skilled D&D workers was clearly beneficial. Initial highly experienced D&D supervision provided great guidance to up and coming foreman who then continued the supervisory role at the end of the project. Positive attitude of the crews provided a good working environment and skills and experience were enhanced during the project.

Obtaining the proper heavy equipment and attachments was very beneficial for the demolition of the buildings and removal of equipment. Having adequate support resources optimized transport of rubble to the TAN Landfill.

Installing an auxiliary entrance to the TAN Landfill west of TAN-607 proved to be advantageous to route transport vehicles a shorter distance and avoid high pedestrian traffic areas.

On the job engineering and safety support provided quick identification of issues and the ability to bring in the correct disciplines to effectively resolve questions and step backs.

Having large size drawings of all the facilities printed out was of great value during prejob briefings and in the field to identify structural elements, foundations, slabs and equipment. A binder of all old construction photos also assisted in quick identification of buried items.

9.2 Demolition of the LOFT Containment Vessel

Initiating a performance based procurement with a best value award allowed innovative bidders to provide workable approaches.

Requiring a full time, onsite subcontractor project manager in addition to the traditional full time, non working superintendent and safety representative, maybe have been more costly, but proved invaluable. The processing of paperwork, communicating with supporting organizations, resolving technical and contractual issues while the superintendent and safety rep followed the work proved very productive.

The subcontractor team was highly skilled, had much experience and provided safe, quality work with a very positive attitude.

Although contractual negotiations were minimal, they were very productive, amicable, and carried out in a timely manner.

Having in house D&D crews and equipment supporting the subcontractor as the Containment Vessel was dropped and cut up was very successful. A sense of mutual respect emerged with the specialized subcontractor and the in house D&D crews. Teamwork was evident with defined roles and no sense of work being taken away from the D&D crews. The subcontractor was pleased with the response of the supporting crews and for not having to lease similar equipment handling the debris once dropped and downsized.

Experienced Rad Con support, dedicated solely to this effort, greatly assisted the segregating, processing, and ultimate disposal of the waste.

The dome did not fall during initial blast as the explosive pressure generated lifted the severed 5/8 in. thick steel dome which shifted and deformed slightly, thereby hanging at two points. Possible solutions were to open door for pressure relief, which could not be done for radiological considerations. Placing circumferential charges on the outside (rather than the inside), shooting down to reduce pressure by 78%. The reason for charge placement inside the dome was to reduce the fly of copper from the linear shaped charge jackets, adversely damaging the adjacent SMC facility.

As always, training requirements identification was a challenge. What similar training from other DOE sites could or could not apply at INL was inconsistent and confusing. Although aggressively worked, it took a lot of effort on both the contractor and subcontractor to resolve and get the folks to work.

9.3 Waste Disposition

Early commitment to establish an interface agreement with ICDF for special handled waste and a dedication to consistent communication via meetings during the process proved to be very valuable.

A working relationship was established with the waste generator and the waste disposal facility that evolved to mutually support a very aggressive schedule at the end of the project to meet company goals.

Unique and difficult wastes were addressed early, and a workable path forward was agreed upon for each, and successfully implemented.

Early identification of weights of intended heavy pieces facilitated liner cushioning calculations to support waste placement planning on the receiving side and support the LOFT delivery schedule.

RadCon's use of a gamma scan resulted in the release of more potentially radiologically contaminated debris than was originally estimated. This resulted in the ability to use the adjacent TAN Landfill for the majority of the waste.

The use of PBS as a lock-down fixative reduced the cost of size reduction efforts and waste containers.

The use of a processor for handling large debris pieces eliminated time consuming hoisting and rigging efforts.

Packaging and Transport personnel turnover created some early confusion on requirements for load packaging, load tie-down, and ultimate over the road travel to ICDF. By the end of the project, good collaboration was evident, resulting in success during the aggressive homestretch.

10. POST-DECOMMISSIONING

Final project documentation will be completed, including this final report and the preparation of the final D&D project data files and photos, for inclusion into the Electronic Document Management System for permanent record storage. All records, plans and files will be placed into the Electronic Document Management System for permanent record storage.

11. REFERENCES

DOE/ID-11276, *Action Memorandum for Decommissioning of TAN-630 and TAN-650 at the Loss-Of-Fluid Test (LOFT) Area*

PLN-2096, “LOFT Demo Plan “

SPC-773, “Demolition of TAN-650 Containment Vessel and ECCS Building”

Appendix A

Project Cost and Schedule

Project Cost and Schedule

Idaho Clean-up Project started May, 2005

Demolition started after Action Memo approved March 24, 2006

Demolition completed October 27, 2006

Total Project Cost $5.6 M

Appendix B

Basement Area Backfill Verification

Figure B-1. B219 areas ready for backfill.

Figure B-2. Basement areas near B219, CV and ECCS building Ready for backfill.

Figure B-3. B105A/B209 Area ready for partial backfill.

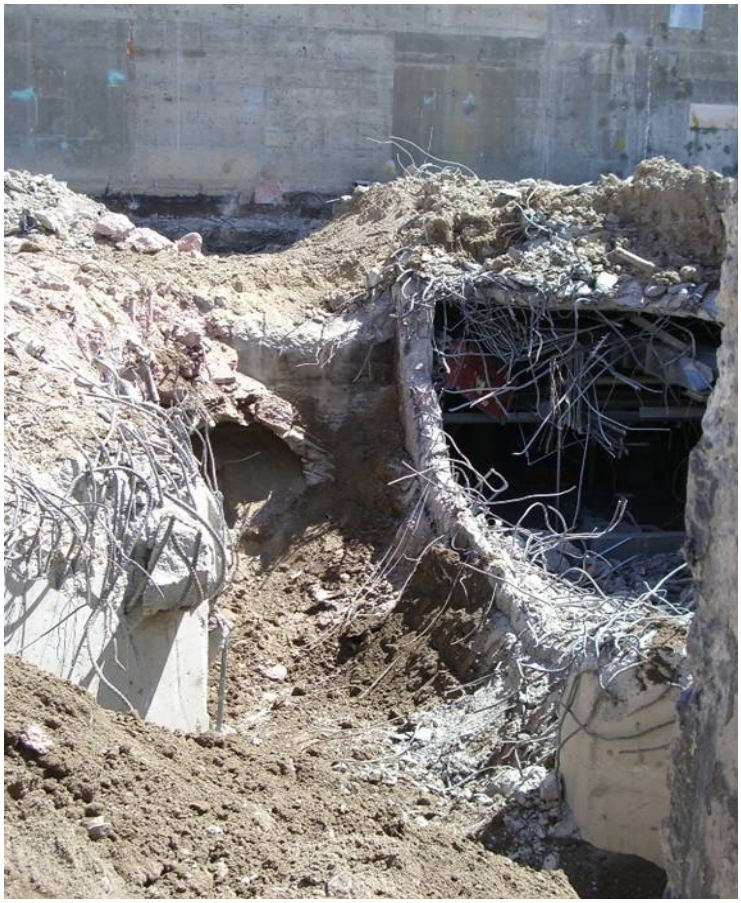

Figure B-4. B209 Area ready for backfill.

Figure B-5. B202 Area ready for backfill.

Figure B-6. B203 Area ready for backfill.

Figure B-7. B203/B201/B204/B205 Areas ready for backfill.

Figure B-8. B203 Area ready for additional backfill.

Figure B-9. B203 Area ready for backfill from South and North.

Figure B-10. B104 Area ready for backfill.

Figure B-11. Structural evaluation of opening to ECCS.

Figure B-12, B103 east area ready for backfill.

Figure B-13. NE portion of B101 area ready for backfill.

Figure B-14. North portion of B101 area ready for partial backfill.

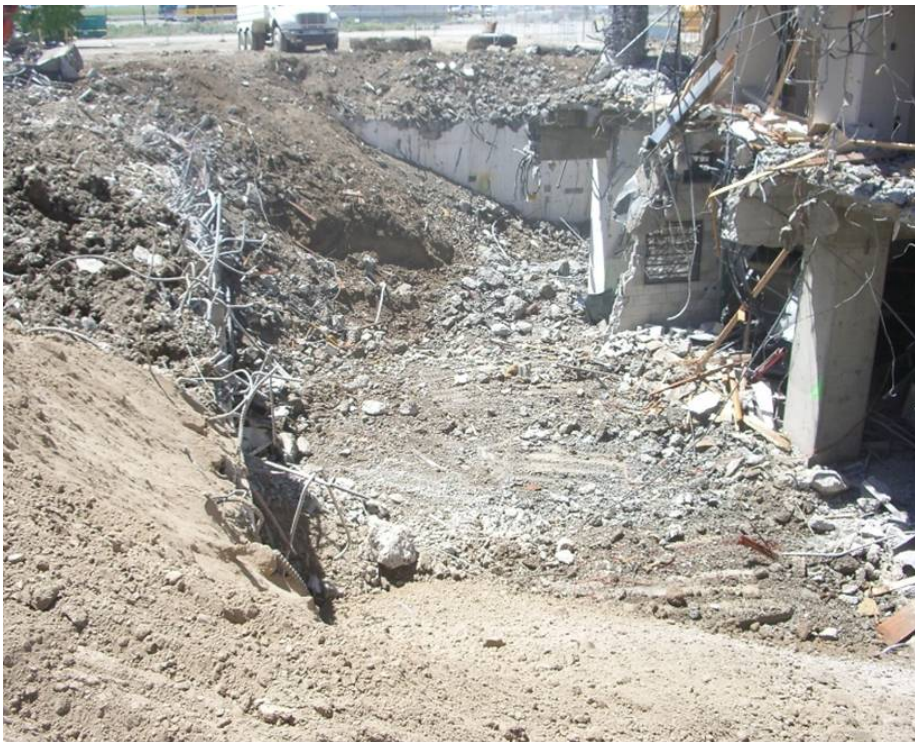

Figure B-15. East portion of B101 area ready for backfill.

Figure B-16. North portion of B101 area ready for backfill.

Figure B-17. South and Southeast portion of B101 area ready for partial backfill.

Figure B-18. Evidence of Segmented Diesel Generator Removal from TAN-630.

Figure B-19. West portion of B103 and B102 area ready for partial backfill.

Figure B-20. West portion of TAN-630 area ready for partial backfill.

Figure B-21. East portion of CV area Rm B224/225 ready for backfill.

Figure B-22. ECCS B210 area stairway ready for backfill.

Figure B-23. B229 Area ready for backfill.

Appendix C

Drawings Inactivated for TAN-630 and TAN-650

Building 630 Drawings

635134	107138	157044	12351408	157084	157105	122162	12971606
635135	157076	107134	157083	157113	157097	157082	157093
635136	157095	157053	107087	202913	157072	157078	157054
635137	157092	157086	122168	107141	12218402	157109	12959202
635138	129595	107090	12959302	107092	20761703	157108	12963303
635139	207617	157152	157107	122100	212461	157103	157106
122098	129593	107542	157052	157102	107082	210129	157050
122099	210851	107083	157091	209441	157056	157079	20761704
122176	122091	201937	122179	122095	210128	157077	21010004
122178	107137	213587	157110	129594	20761702	157080	122096
122180	107136	107080	12949105	157074	208836	157100	122165
122181	122175	107089	157649	157647	107088	157101	201938
122182	157073	107081	157094	107091	117513	122092	157057
122183	122093	210245	122094	107538	157154	157096	157081
107085	122097	157112	157045	157087	107093	157153	157294
12959402	157090	157085	203510	107135	107084	157111	
157098	157099	157075	122184	157104	107537	157088	
107133	107139	157151	157089	157051	107140	107086	

Building 650 Drawings.

628711	125900	126044	122773	211289	125965	122224	125944
418952	122829	126167	122794	122791	125215	209710	122749
41895202	126089	126075	202912	125970	126061	125090	125272
627691	125914	122242	126041	208988	21039502	12277702	125756
327692	125202	122733	125863	122790	126128	214310	210778
628018	125982	126138	125280	157689	126035	125792	126020
628019	125784	125836	125995	125883	125922	202859	125304
630210	125783	125859	126048	125796	125212	126074	126014
630212	155411	1285293	125960	126065	125926	122768	125951
12277902	122921	126132	155410	125992	125260	12798502	125978
126106	125842	126008	126044	155413	122782	125853	125954
20430405	125778	20973102	126167	125217	125216	122230	126141
122808	122921	126156	126075	207589	122803	122762	125846
125940	125277	126171	122242	125986	126133	125203	122214
122217	125235	122731	122733	126016	125820	122753	126025
125833	126022	125804	126138	125759	125875	125227	125839
125245	125296	214166	125836	122229	126066	125969	207719
210099	125257	122504	125859	125219	21009903	125214	209731
125826	125906	125781	125293	126092	125878	125274	126107
126054	126038	125848	126132	122752	125803	126018	125822
126174	122773	211289	126008	125789	122823	125270	12505603
126053	122794	122744	20973102	122754	126165	125205	125775
122741	202912	126117	126156	122739	125269	122734	125856
125962	126041	125277	126171	126108	126057	122225	125852
128117	125863	125235	122731	126129	20715802	122777	125243
126077	125280	126022	125804	125241	125956	122795	122748
122815	125995	125296	122504	125880	125876	125238	122737
125819	126048	125906	125781	125753	125877	126112	203813
125284	155410	126038	125848	125838	125998	125980	125913
122761	126047	122830	126091	12798303	125867	126168	125837
125871	126006	126143	20758903	157688	125285	125891	125248
125915	126142	125776	125928	125675	126166	125263	122826

Building 650 Drawings. (continued).

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125930	126085	125295	125990	125921	126126	126059	126124
207079	125809	122805	125873	125929	126144	125847	125959
126169	125802	20973103	122788	125815	122750	122775	125300
122236	125786	12798403	126076	125225	157685	125828	126140
126115	207795	122809	125950	125925	125974	122781	125258
127985	126088	126052	122787	125972	125764	126069	122814
125228	12282202	125268	126060	137351	160316	125964	126135
210785	12798505	125957	12286303	126099	122786	125862	206912
126154	126027	12273603	203822	125917	126032	125868	125814
12222202	122215	20779410	122238	122799	210782	125869	125832
155409	122825	12505602	125830	125812	12798405	200120	128766
125843	125890	126170	122819	126019	155416	155793	12222602
125254	125936	125942	125787	125762	125898	12222203	125988
125275	127983	126023	207170	211792	125979	125834	210781
126095	125201	125976	125918	126109	125811	122827	125252
12273703	122757	155408	125253	157035	126152	126131	126051
122797	126013	155791	125206	126001	125282	126040	126055
125919	12275802	155415	126127	12221902	125958	207143	157055
20707902	122241	125893	126058	200884	125835	122763	125291
125960	125257	214166	125256	125997	125999	125261	1260980
125865	125905	125239	125276	157438	125303	125301	125895
125771	125938	125299	125805	125985	210779	126105	126130
125851	207735	126086	125800	125941	122792	125229	126026
125948	122780	125888	126009	126160	125218	125825	125933
20430404	122726	125845	126015	122824	125909	125864	126031
125866	125981	126119	126017	122226	125289	20707903	126097
126005	125279	125233	125758	125886	125294	122738	126164
126034	122725	125902	125923	126090	212097	125953	210784
125250	12798305	125761	125924	126094	122783	125955	206850
122810	125961	125267	125927	126110	125290	157048	207158
122727	125818	12259902	125949	125207	125297	122736	207713

Building 650 Drawings. (continued).

157047	126114	210780	203821	125221	125305	122772	126068
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125750	125935	42317402	12798302	125232	12277903	125966	126111
125283	125884	125292	125987	125240	12278003	125967	126113
122760	125266	125306	125989	125242	122798	125968	205358
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126122	158333	125751	126033	125264	13832402	125983	122801
125763	125801	125752	126036	125265	125798	125993	128118
126067	122770	125760	126043	125273	125807	126000	128123
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203864	125889	125782	122240	126150	125829	126007	125209
122222	21042902	125790	200180	126151	125854	126012	125213
21203802	125773	122779	200182	126155	125857	126021	125222
157046	125757	122784	202911	126159	125874	126037	125236
126123	125841	125791	157646	126161	125904	126039	125237
12798402	126083	125794	209709	126172	125910	126046	125247
125824	125840	125799	21009902	12275402	125911	126049	125249
125223	125887	125821	21019402	210184	125912	122216	125251
126079	122816	125827	210783	122742	125931	122235	125255
208971	125780	125831	125056	122774	125932	122237	125262
126100	126071	125850	12273702	122776	125937	200114	125271
126173	122821	125858	122740	12277602	125943	12798503	126134
125278	126078	125860	126062	12277706	125945	12798506	126136
125288	125882	125861	126070	122778	125946	210194	126137
126125	125817	125885	126073	627694	125947	210429	126162
126064	125220	125908	126082	155792	125952	21078002	12275403
122729	125307	125797	157687	126028	126093	125287	12277302
122746	125754	125816	207734	126030	126101	126145	12277705
122755	125755	125823	20973104	126042	126102	126149	628016
122756	125765	125870	210395	126050	126116	126157	628021
12275702	125768	125872	12273602	20898802	126121	126158	630211
122759	125772	125879	122771	122231	122766	122793	425553

Building 650 Drawings. (continued).

12277303	125774	125881	122800	122234	122789	122811	166571
12277703	125779	125892	127984	200181	122822	122812	
12277704	125785	125899	125975	12798504	128101	122730	
122213	125788	125903	125991	20707904	125200	122745	
210523	12278002	125907	125994	210114	125210	122747	
122828	122785	125916	126002	126063	125211	122751	
125298	122818	125939	126004	126080	125246	12275302	
125302	125795	157686	126011	126087	125259	122758	

Appendix D

Final Cover Details

MOISTURE DENSITY TEST DATA

Client: TAN - BBWI
Project: Misc. projects
Project Number:

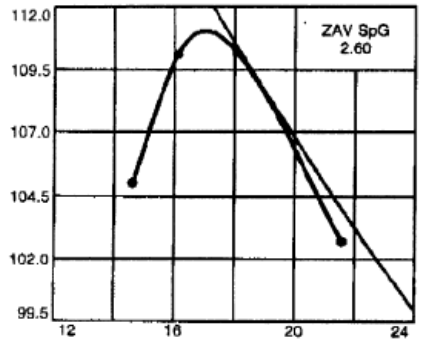
Specimen Data

Source: Loft Excavated Soils
Sample No.: Loft Capping Soil
Elev. or Depth: Stockpile **Sample Length (in./cm.):**
Location:
Description: Lean clay with sand
USCS Classification: CL **AASHTO Classification:** A-6(14)
Natural Moisture: N/A **Liquid Limit:** 35.6 **Plasticity Index:** 18.3
Testing Remarks: Sampled by Tom Borschel from TAN/Loft area soils.

LL #193
Percent retained on No.4 sieve: 0.0
Percent passing No. 200 sieve: 80.1 **Specific gravity:** 2.60

Test Data And Results

Type of test: ASTM D 698-91 Method A Standard



POINT NO.	1	2	3	4
WM + WS	6110.8	6223.7	6257.5	6178.7
WM	4291.0	4291.0	4291.0	4291.0
WW+T	780.00	933.10	694.50	1234.40
WD+T	680.50	803.60	588.20	1015.40
TARE	0.00	0.00	0.00	0.00
MOIST	14.6	16.1	18.1	21.6
MOISTURE	14.6	16.1	18.1	21.6
DRY DEN	105.0	110.1	110.2	102.7

Max dry den= 111.0 pcf **Opt moisture=** 17.0 %

Uncorrected Results: **Max dry den=** 111.0 pcf **Opt moisture=** 17.0 %

ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.60
Moisture of Oversize Material = %
Corrections Applied to Every Test Point

INEL MATERIALS LAB

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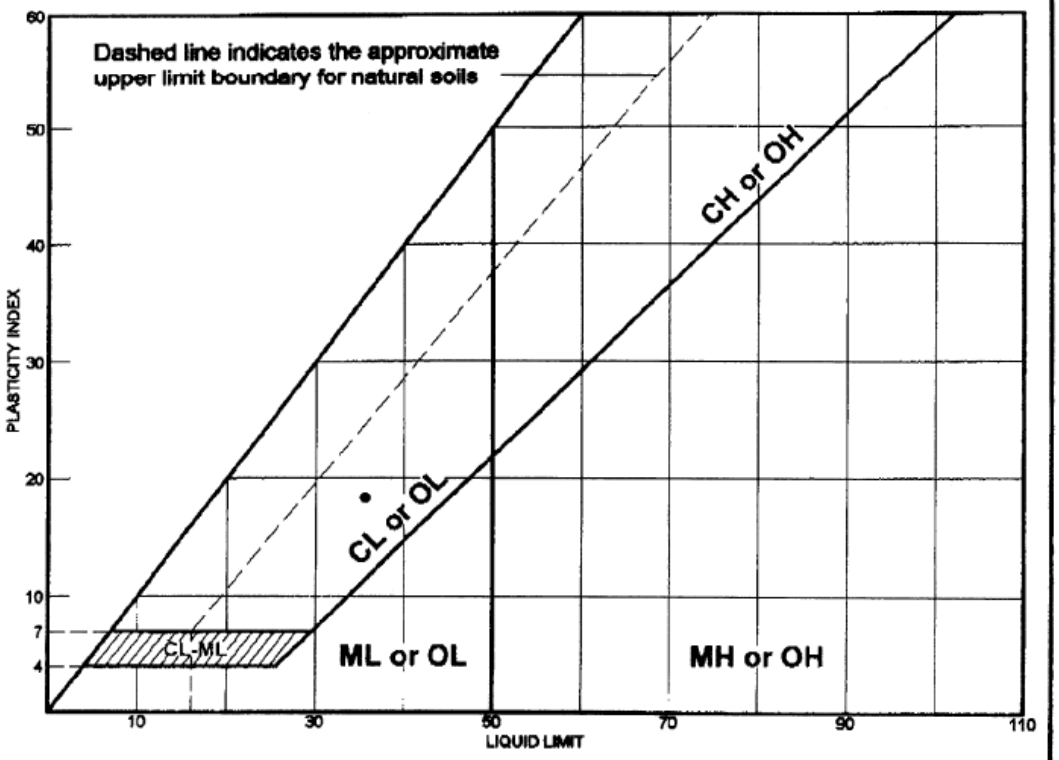
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean clay with sand	35.6	17.3	18.3	99.1	80.1	CL

Project No. **Client:** TAN - BBWI

Project: Misc. projects

● **Source:** Loft Excavated Soils **Sample No.:** Loft Capping **Elev./Depth:** Stockpile

Remarks:

● Sampled by Tom Borschel, Loft Area soils.

LL 193

LIQUID AND PLASTIC LIMITS TEST REPORT

INEL MATERIALS LAB

Plate

LIQUID AND PLASTIC LIMIT TEST DATA

Client: TAN - BBWI
Project: Misc. projects
Project Number:

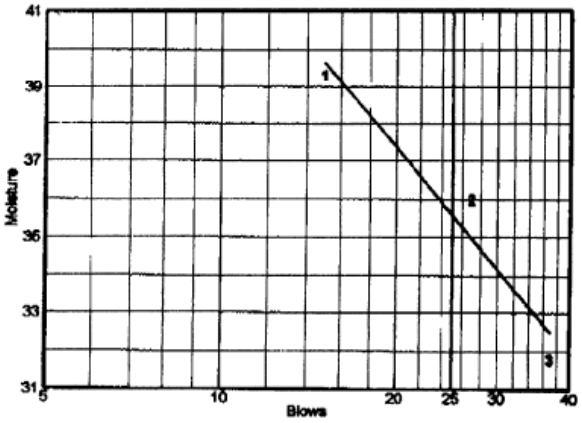
Sample Data

Source: Loft Excavated Soils
Sample No.: Loft Capping Soil
Elev. or Depth: Stockpile **Sample Length (in./cm.):**
Location:
Description: Lean clay with sand
%<#40: 99.1 **%<#200:** 80.1 **USCS:** CL **AASHTO:** A-6(14)
Testing Remarks: Sampled by Tom Borschel, Loft Area soils.

LL 193

Liquid Limit Data

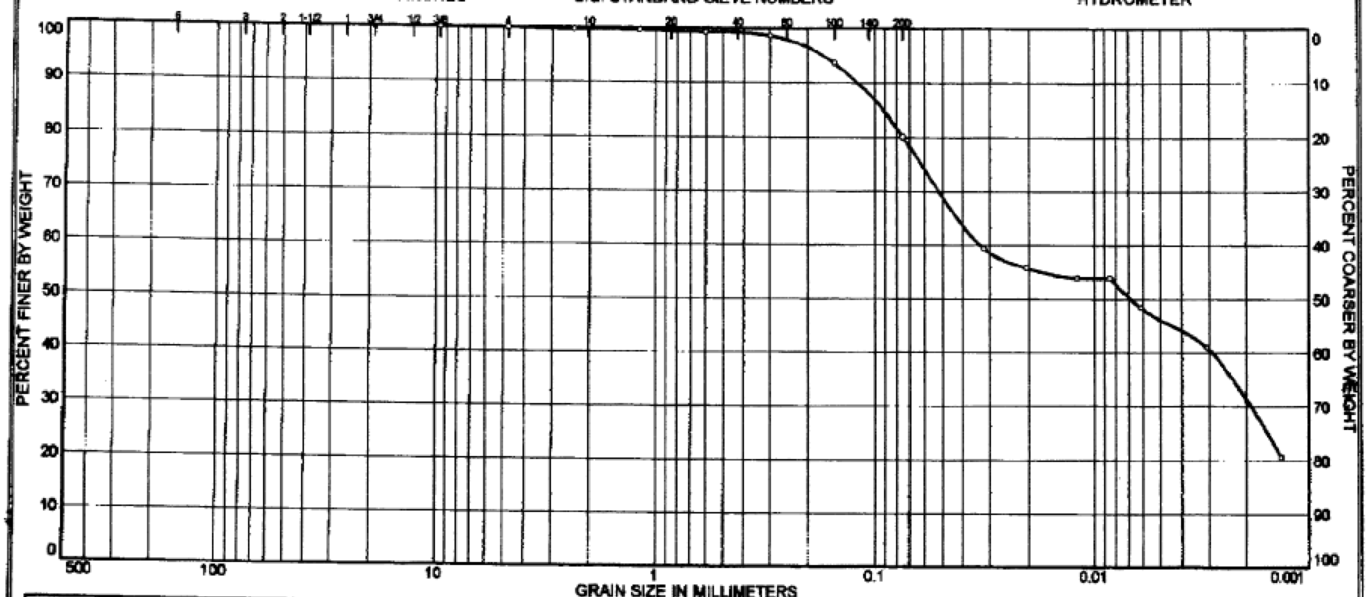
Run No.	1	2	3	4	5	6
Wet+Tare	21.00	20.13	20.11			
Dry+Tare	18.22	17.75	17.95			
Tare	11.15	11.14	11.15			
# Blows	15	27	37			
Moisture	39.3	36.0	31.8			



Liquid Limit= 35.6
Plastic Limit= 17.3
Plasticity Index= 18.3

INEL MATERIALS LAB

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.3	0.6	19.0	34.0	46.1

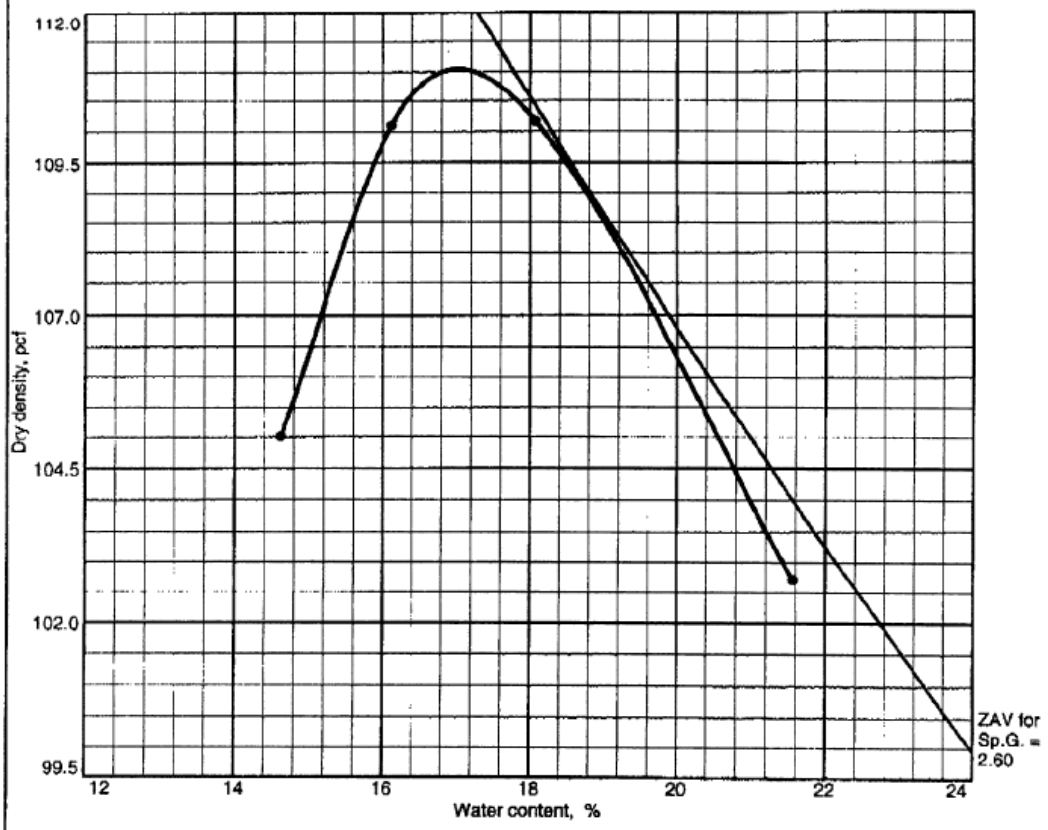
	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Loft Excavated Soils	Loft Capping Soil	Stockpile	7/10/2006	CL	Lean clay with sand	N/A	35.6	17.3

Client TAN - BBWI
Project Misc. projects
Project No. Plate

INEL MATERIALS LAB

○ Sampled by Tom Borschel from Loft Area excavated soils.
LL 193

COMPACTION TEST REPORT



Test specification: ASTM D 698-91 Method A Standard
Oversize correction applied to each point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
Stockpile	CL	A-6(14)	N/A	2.60	35.6	18.3	0.0	80.1

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 111.0 pcf Optimum moisture = 17.0 %	Lean clay with sand

Project No. **Client:** TAN - BBWI
Project: Misc. projects

● **Source:** Loft Excavated **Sample No.:** Loft **Elev./Depth:** Stockpile

COMPACTION TEST REPORT

INEL MATERIALS LAB

Remarks:
Sampled by Tom Borschel from TAN/Loft area soils.

LL #193

Plate

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PERMEABILITY TEST REPORT

TEST DATA:
Specimen Height (cm): 11.69
Specimen Diameter (cm): 10.16
Dry Unit Weight (pcf): 94.6
Moisture Before Test (%): 14.6
Moisture After Test (%): 21.8
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 70.0

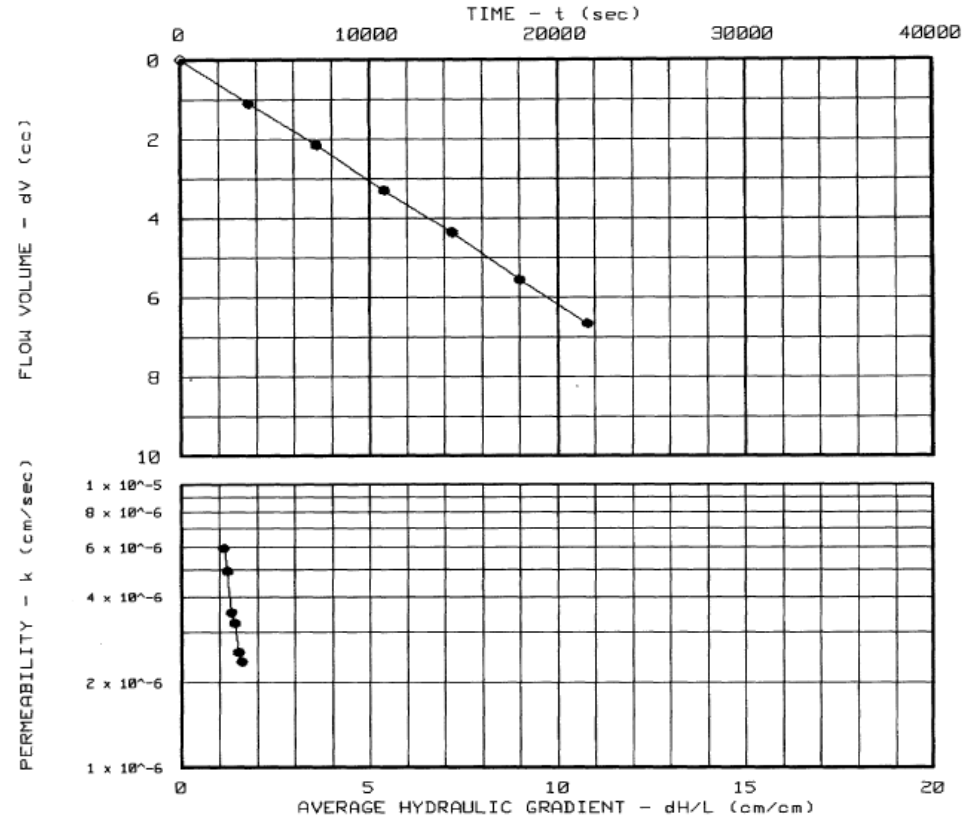
Sat. Pressure (psi): 60.0
Diff. Head (psi): 0.3

Perm. (cm/sec): 3.58 x 10^-6

SAMPLE DATA:
Sample Identification: TAN area soils

Visual Description: TAN area excavated soil to be used for the soils Cap.
Remarks:

Maximum Dry Density (pcf): 111.0
Optimum Moisture Content (%): 17.0
ASTM(D698)
Percent Compaction: 85.2%
Permeameter type:
Sample type:



Project: TAN/LOFT Soil Cap
Location: TAN/LOFT areas
Date: 10/10/06

PERMEABILITY TEST REPORT
INEEL MATERIALS LAB

Project No.:
File No.:
Lab No.: 193
Tested by: HCB
Checked by:
Test: FH - Falling head C

PERMEABILITY TEST REPORT

TEST DATA:
Specimen Height (cm): 6.97
Specimen Diameter (cm): 10.17
Dry Unit Weight (pcf): 106.4
Moisture Before Test (%): 15.4
Moisture After Test (%): 26.2
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 70.0

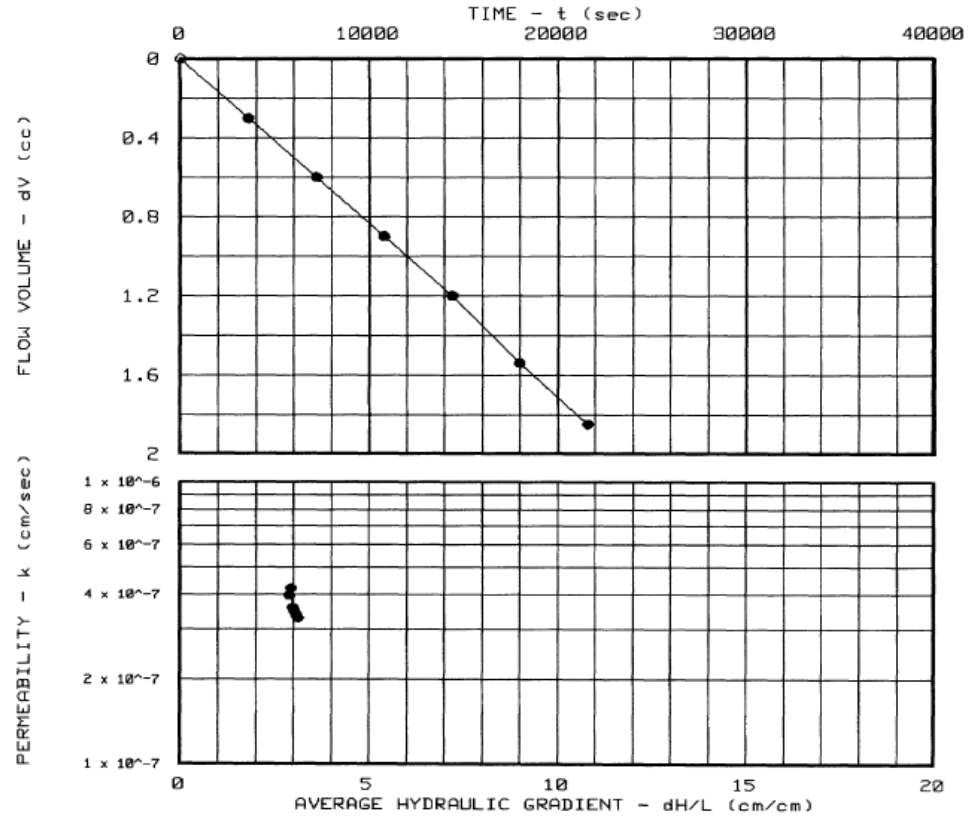
Sat. Pressure (psi): 60.0
Diff. Head (psi): 0.3

Perm. (cm/sec): 3.72 x 10^-7

SAMPLE DATA:
Sample Identification: TAN/Loft Areas

Visual Description: Site excavated soils to be used for the Cap
Remarks:

Maximum Dry Density (pcf): 111.0
Optimum Moisture Content (%): 17.0
ASTM(D698)
Percent Compaction: 95.8%
Permeameter type: Flex Wall
Sample type: Bag



Project: Tan/Loft Soil Cap
Location: Tan Loft Area
Date: 9/20/2006

PERMEABILITY TEST REPORT

INEEL MATERIALS LAB

Project No.:
File No.:
Lab No.:
Tested by: HCB
Checked by:
Test: FH - Falling head C

432.11
04-97
Rev. 01

NUCLEAR RELATIVE COMPACTION TEST DATA

Project: Tan 1.ft CAP

Contract No.: F.A.

Date: 10-24-06

Tested By: N. DeWitt

Test Number	1	2	3	4	5	6	7	8	9	10
Station										
Location	Center of CAP	30' west of center of cap	10' East 10' North Of center							
Elevation or Lift	F.G.	F.G.	F.G.							
Mode & Depth	12"	12"	12"							
Wet Density PCF	124.7	123.6	120.0							
Moisture PCF	N/A	N/A	N/A							
Dry Density PCF	110.7	110.5	110.1							
% Moisture	12.7	11.9	8.9							
Optimum Moisture	17.0	17.0	17.0							
Max. Obtainable Density PCF	111.0	111.0	~~110.1~~ 111.0 MD							
% Relative Compaction	99.7	99.5	99.2							
% Specification Compaction Minimum										

Standard Count	
Density	Moisture
2364	512

NOTE: Use reverse side for more definitive location of tests.

Record Inst. S/N: 18792

Date Calibrated: 10-24-06

ASTM Methods:

D-2922

D-3017

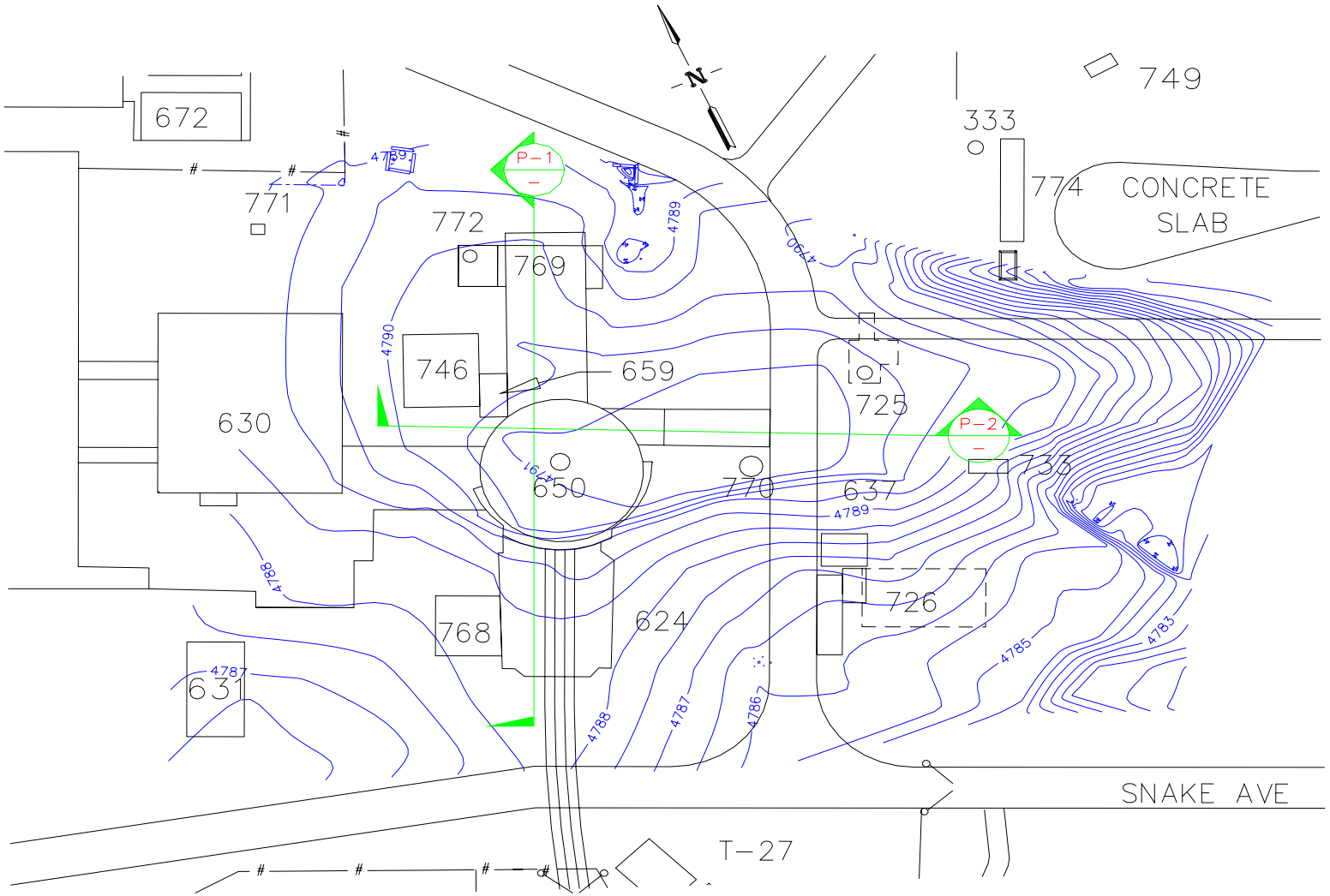
VALLEY READY MIX, Inc.
2500 West 65th South • Idaho Falls, Idaho 83402 • (208) 529-6677 • FAX (208) 529-2150

Mix Design
Backfill 100 - 500 psi

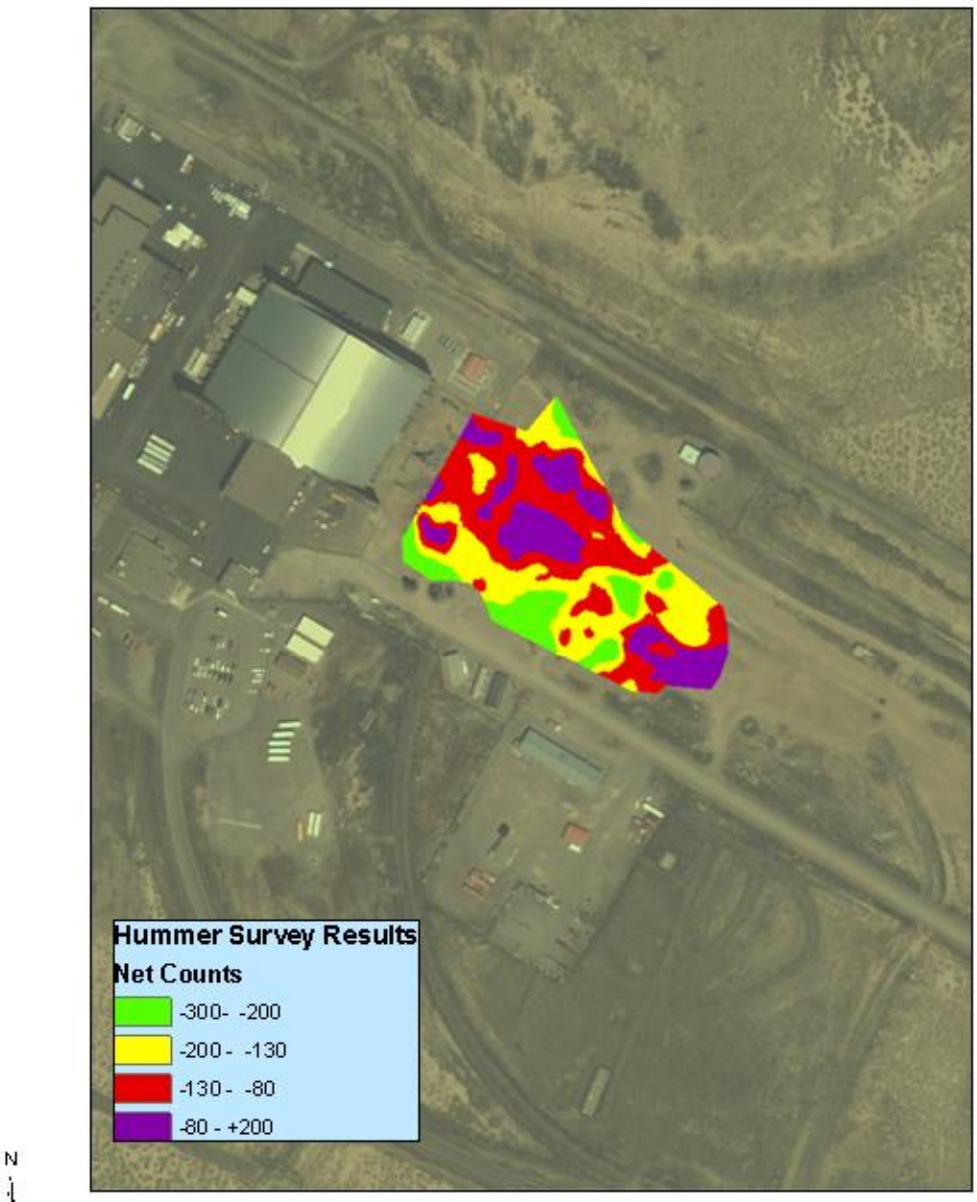
PROJECT:

COMPONENTS:	BATCH WEIGHTS, lbs./cubic yards Aggregates - SSD
Cement: Type I & II LA ASTM C150 Ash Grove	200 lbs.
Pozzolan Class F Fly Ash IG Resources, Inc. ASTM C618	235 lbs.
Water	25 gal./209 lbs.
F.A.: Sand BN-140C ASTM C33	2307 lbs.
Master Builders Rheocell 30	7 oz./per cubic yard
Master Builders Polyhead 997	15 to 20 oz. per cubic yard
W/C Ratio	.55
Air Content	25 to 30%
Slump	Self Leveling

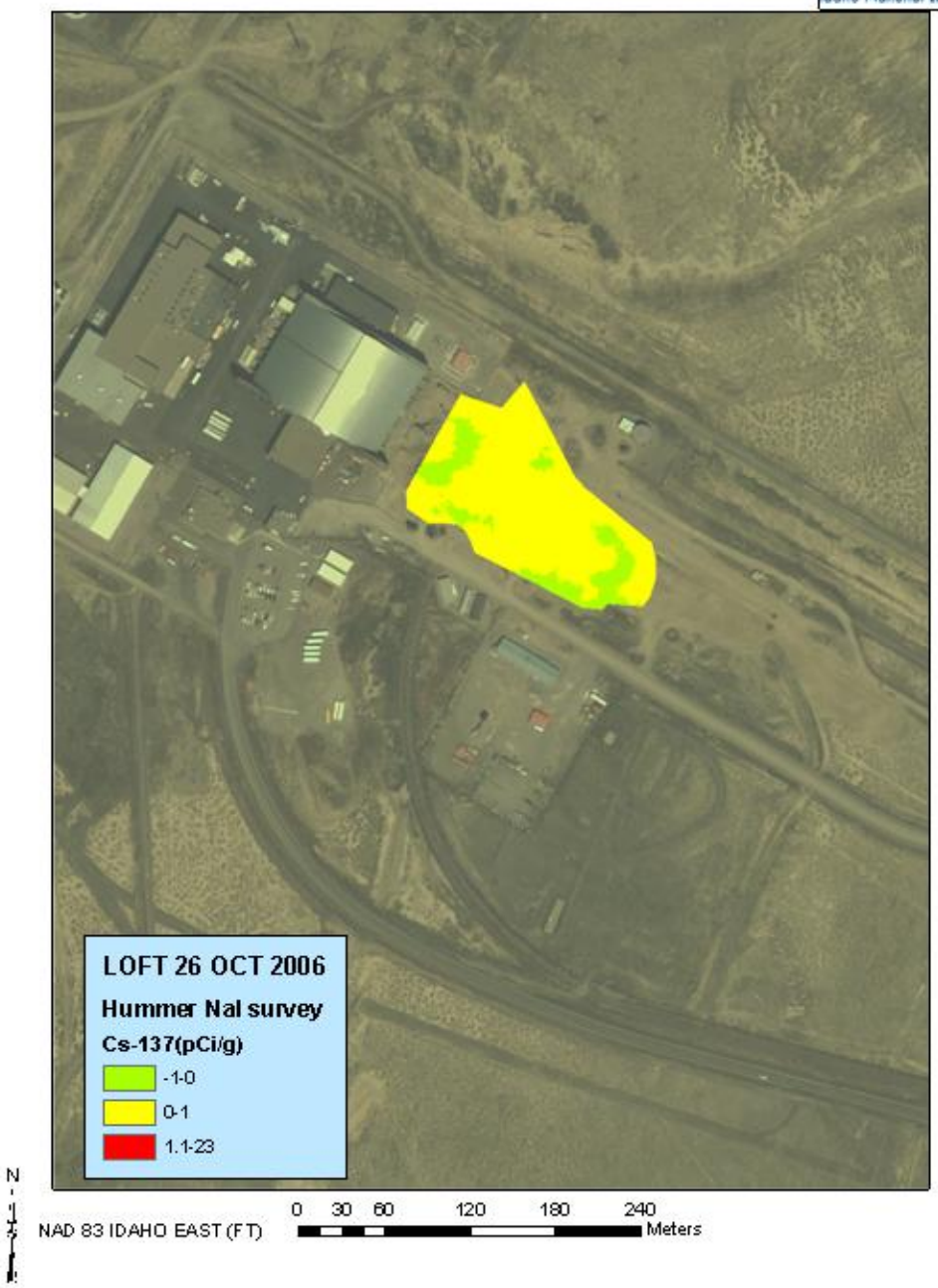
Fine Aggregate: BN-140C Specific gravity 2.52 with 1.5% absorption
Fresh Unit Weight = 109.30 lbs./cubic feet


N
672
771
772
769
746
659
630
650
770
637
725
P-1
P-2
749
333
774
CONCRETE
SLAB
768
624
726
631
735
SNAKE AVE
T-27
4789
4790
4788
4787
4786
4785
4783
4791

HUMMER DRIVEOVER SURVEY RESULTS--LOFT 26 0OCT




LOFT 26 OCT 2006
N
0 15 30 60 90 120
NAD 83 IDAHO EAST (FT)
Meters


LOFT 26 OCT 2006
Hummer NaI survey
Cs-137(pCi/g)
-1-0
0-1
1.1-23
N
NAD 83 IDAHO EAST (FT)
0 30 60 120 180 240
Meters

Appendix E

Waste Volumes Generated

Waste Volumes Generated

TAN Landfill (clean)	14,966 yds3
ICDF Landfill (contaminated)	1,186 yds3
CFA Landfill (asbestos)	180 ft3