

Attachment I

Ft. Smith & Tulsa Star Data

Ft. Smith STAR Data

N	A	0.00021	0.00046	0.00000	0.00000	0.00000	0.00000
NNE	A	0.00009	0.00018	0.00000	0.00000	0.00000	0.00000
NE	A	0.00031	0.00043	0.00000	0.00000	0.00000	0.00000
ENE	A	0.00027	0.00073	0.00000	0.00000	0.00000	0.00000
E	A	0.00053	0.00107	0.00000	0.00000	0.00000	0.00000
ESE	A	0.00026	0.00089	0.00000	0.00000	0.00000	0.00000
SE	A	0.00025	0.00041	0.00000	0.00000	0.00000	0.00000
SSE	A	0.00019	0.00046	0.00000	0.00000	0.00000	0.00000
S	A	0.00025	0.00059	0.00000	0.00000	0.00000	0.00000
SSW	A	0.00021	0.00059	0.00000	0.00000	0.00000	0.00000
SW	A	0.00026	0.00041	0.00000	0.00000	0.00000	0.00000
WSW	A	0.00030	0.00055	0.00000	0.00000	0.00000	0.00000
W	A	0.00032	0.00059	0.00000	0.00000	0.00000	0.00000
WNW	A	0.00020	0.00039	0.00000	0.00000	0.00000	0.00000
NW	A	0.00015	0.00025	0.00000	0.00000	0.00000	0.00000
NNW	A	0.00009	0.00023	0.00000	0.00000	0.00000	0.00000
N	B	0.00082	0.00171	0.00089	0.00000	0.00000	0.00000
NNE	B	0.00063	0.00114	0.00082	0.00000	0.00000	0.00000
NE	B	0.00113	0.00201	0.00107	0.00000	0.00000	0.00000
ENE	B	0.00179	0.00415	0.00224	0.00000	0.00000	0.00000
E	B	0.00290	0.00664	0.00499	0.00000	0.00000	0.00000
ESE	B	0.00161	0.00333	0.00183	0.00000	0.00000	0.00000
SE	B	0.00081	0.00151	0.00148	0.00000	0.00000	0.00000
SSE	B	0.00097	0.00130	0.00094	0.00000	0.00000	0.00000
S	B	0.00111	0.00214	0.00196	0.00000	0.00000	0.00000
SSW	B	0.00078	0.00210	0.00192	0.00000	0.00000	0.00000
SW	B	0.00062	0.00183	0.00212	0.00000	0.00000	0.00000
WSW	B	0.00095	0.00203	0.00183	0.00000	0.00000	0.00000
W	B	0.00085	0.00260	0.00242	0.00000	0.00000	0.00000
WNW	B	0.00060	0.00139	0.00114	0.00000	0.00000	0.00000
NW	B	0.00050	0.00135	0.00078	0.00000	0.00000	0.00000

NNW	B	0.00037	0.00066	0.00050	0.00000	0.00000	0.00000
N	C	0.00013	0.00128	0.00310	0.00100	0.00005	0.00000
NNE	C	0.00024	0.00098	0.00098	0.00009	0.00000	0.00000
NE	C	0.00033	0.00203	0.00224	0.00018	0.00000	0.00000
ENE	C	0.00090	0.00727	0.00725	0.00064	0.00000	0.00000
E	C	0.00122	0.00894	0.01505	0.00155	0.00002	0.00000
ESE	C	0.00046	0.00306	0.00550	0.00062	0.00000	0.00000
SE	C	0.00034	0.00164	0.00212	0.00025	0.00000	0.00000
SSE	C	0.00020	0.00107	0.00228	0.00039	0.00000	0.00000
S	C	0.00026	0.00178	0.00367	0.00128	0.00002	0.00000
SSW	C	0.00024	0.00128	0.00461	0.00141	0.00002	0.00000
SW	C	0.00027	0.00160	0.00518	0.00221	0.00002	0.00002
WSW	C	0.00036	0.00201	0.00461	0.00123	0.00005	0.00002
W	C	0.00044	0.00290	0.00675	0.00141	0.00005	0.00000
WNW	C	0.00023	0.00128	0.00386	0.00078	0.00007	0.00000
NW	C	0.00022	0.00110	0.00255	0.00064	0.00009	0.00000
NNW	C	0.00017	0.00064	0.00169	0.00030	0.00000	0.00000
N	D	0.00100	0.00367	0.01020	0.01464	0.00153	0.00014
NNE	D	0.00078	0.00276	0.00502	0.00379	0.00046	0.00007
NE	D	0.00146	0.00490	0.00547	0.00189	0.00014	0.00000
ENE	D	0.00247	0.01102	0.01357	0.00417	0.00007	0.00002
E	D	0.00388	0.01759	0.04092	0.02182	0.00103	0.00005
ESE	D	0.00169	0.00680	0.01163	0.00657	0.00027	0.00005
SE	D	0.00094	0.00388	0.00504	0.00265	0.00005	0.00000
SSE	D	0.00080	0.00260	0.00354	0.00201	0.00009	0.00000
S	D	0.00130	0.00376	0.00648	0.00486	0.00021	0.00000
SSW	D	0.00068	0.00203	0.00481	0.00607	0.00041	0.00005
SW	D	0.00057	0.00226	0.00486	0.00994	0.00153	0.00018
WSW	D	0.00085	0.00331	0.00566	0.00591	0.00075	0.00021
W	D	0.00092	0.00470	0.01134	0.01286	0.00173	0.00071
WNW	D	0.00058	0.00267	0.00851	0.01355	0.00283	0.00043
NW	D	0.00039	0.00194	0.00650	0.01111	0.00144	0.00018

NNW	D	0.00036	0.00148	0.00527	0.00734	0.00078	0.00016
N	E	0.00000	0.00212	0.00568	0.00000	0.00000	0.00000
NNE	E	0.00000	0.00221	0.00205	0.00000	0.00000	0.00000
NE	E	0.00000	0.00490	0.00116	0.00000	0.00000	0.00000
ENE	E	0.00000	0.01291	0.00411	0.00000	0.00000	0.00000
E	E	0.00000	0.01667	0.01006	0.00000	0.00000	0.00000
ESE	E	0.00000	0.00609	0.00160	0.00000	0.00000	0.00000
SE	E	0.00000	0.00365	0.00082	0.00000	0.00000	0.00000
SSE	E	0.00000	0.00169	0.00062	0.00000	0.00000	0.00000
S	E	0.00000	0.00317	0.00169	0.00000	0.00000	0.00000
SSW	E	0.00000	0.00185	0.00160	0.00000	0.00000	0.00000
SW	E	0.00000	0.00224	0.00210	0.00000	0.00000	0.00000
WSW	E	0.00000	0.00292	0.00260	0.00000	0.00000	0.00000
W	E	0.00000	0.00372	0.00967	0.00000	0.00000	0.00000
WNW	E	0.00000	0.00144	0.00541	0.00000	0.00000	0.00000
NW	E	0.00000	0.00084	0.00379	0.00000	0.00000	0.00000
NNW	E	0.00000	0.00080	0.00274	0.00000	0.00000	0.00000
N	F	0.00322	0.00360	0.00000	0.00000	0.00000	0.00000
NNE	F	0.00443	0.00417	0.00000	0.00000	0.00000	0.00000
NE	F	0.01360	0.01197	0.00000	0.00000	0.00000	0.00000
ENE	F	0.02845	0.03166	0.00000	0.00000	0.00000	0.00000
E	F	0.02872	0.03031	0.00000	0.00000	0.00000	0.00000
ESE	F	0.01126	0.00718	0.00000	0.00000	0.00000	0.00000
SE	F	0.00540	0.00388	0.00000	0.00000	0.00000	0.00000
SSE	F	0.00418	0.00308	0.00000	0.00000	0.00000	0.00000
S	F	0.00601	0.00532	0.00000	0.00000	0.00000	0.00000
SSW	F	0.00393	0.00383	0.00000	0.00000	0.00000	0.00000
SW	F	0.00528	0.00438	0.00000	0.00000	0.00000	0.00000
WSW	F	0.00684	0.00776	0.00000	0.00000	0.00000	0.00000
W	F	0.00805	0.01083	0.00000	0.00000	0.00000	0.00000
WNW	F	0.00215	0.00267	0.00000	0.00000	0.00000	0.00000
NW	F	0.00142	0.00171	0.00000	0.00000	0.00000	0.00000

NNW F 0.00112 0.00119 0.00000 0.00000 0.00000 0.00000

Tulsa STAR Data

N	A	0.00038	0.00032	0.00000	0.00000	0.00000	0.00000
NNE	A	0.00012	0.00014	0.00000	0.00000	0.00000	0.00000
NE	A	0.00019	0.00016	0.00000	0.00000	0.00000	0.00000
ENE	A	0.00017	0.00009	0.00000	0.00000	0.00000	0.00000
E	A	0.00040	0.00030	0.00000	0.00000	0.00000	0.00000
ESE	A	0.00031	0.00025	0.00000	0.00000	0.00000	0.00000
SE	A	0.00050	0.00041	0.00000	0.00000	0.00000	0.00000
SSE	A	0.00033	0.00032	0.00000	0.00000	0.00000	0.00000
S	A	0.00043	0.00048	0.00000	0.00000	0.00000	0.00000
SSW	A	0.00023	0.00021	0.00000	0.00000	0.00000	0.00000
SW	A	0.00031	0.00025	0.00000	0.00000	0.00000	0.00000
WSW	A	0.00012	0.00014	0.00000	0.00000	0.00000	0.00000
W	A	0.00036	0.00025	0.00000	0.00000	0.00000	0.00000
WNW	A	0.00025	0.00023	0.00000	0.00000	0.00000	0.00000
NW	A	0.00019	0.00007	0.00000	0.00000	0.00000	0.00000
NNW	A	0.00017	0.00009	0.00000	0.00000	0.00000	0.00000
N	B	0.00154	0.00217	0.00135	0.00000	0.00000	0.00000
NNE	B	0.00068	0.00082	0.00055	0.00000	0.00000	0.00000
NE	B	0.00056	0.00128	0.00046	0.00000	0.00000	0.00000
ENE	B	0.00078	0.00100	0.00066	0.00000	0.00000	0.00000
E	B	0.00103	0.00162	0.00080	0.00000	0.00000	0.00000
ESE	B	0.00052	0.00071	0.00053	0.00000	0.00000	0.00000
SE	B	0.00079	0.00144	0.00098	0.00000	0.00000	0.00000
SSE	B	0.00085	0.00183	0.00148	0.00000	0.00000	0.00000
S	B	0.00152	0.00322	0.00313	0.00000	0.00000	0.00000
SSW	B	0.00091	0.00132	0.00110	0.00000	0.00000	0.00000
SW	B	0.00080	0.00121	0.00098	0.00000	0.00000	0.00000
WSW	B	0.00044	0.00084	0.00039	0.00000	0.00000	0.00000
W	B	0.00071	0.00082	0.00030	0.00000	0.00000	0.00000
WNW	B	0.00037	0.00055	0.00037	0.00000	0.00000	0.00000

NW	B	0.00078	0.00087	0.00055	0.00000	0.00000	0.00000
NNW	B	0.00049	0.00110	0.00071	0.00000	0.00000	0.00000
N	C	0.00047	0.00274	0.00546	0.00144	0.00007	0.00000
NNE	C	0.00020	0.00110	0.00288	0.00080	0.00007	0.00000
NE	C	0.00024	0.00121	0.00151	0.00046	0.00005	0.00000
ENE	C	0.00016	0.00073	0.00144	0.00018	0.00000	0.00000
E	C	0.00028	0.00135	0.00231	0.00032	0.00000	0.00000
ESE	C	0.00028	0.00107	0.00212	0.00032	0.00000	0.00000
SE	C	0.00023	0.00171	0.00338	0.00059	0.00005	0.00000
SSE	C	0.00041	0.00244	0.00744	0.00242	0.00041	0.00005
S	C	0.00072	0.00372	0.01313	0.00632	0.00164	0.00037
SSW	C	0.00024	0.00162	0.00493	0.00242	0.00048	0.00002
SW	C	0.00030	0.00123	0.00340	0.00142	0.00014	0.00000
WSW	C	0.00016	0.00096	0.00201	0.00053	0.00000	0.00005
W	C	0.00029	0.00137	0.00158	0.00034	0.00000	0.00000
WNW	C	0.00024	0.00119	0.00215	0.00046	0.00002	0.00000
NW	C	0.00030	0.00192	0.00201	0.00041	0.00002	0.00000
NNW	C	0.00038	0.00194	0.00336	0.00068	0.00007	0.00000
N	D	0.00197	0.00840	0.02374	0.03176	0.00701	0.00062
NNE	D	0.00064	0.00231	0.00842	0.01219	0.00203	0.00027
NE	D	0.00053	0.00242	0.00571	0.00390	0.00071	0.00016
ENE	D	0.00054	0.00267	0.00306	0.00128	0.00011	0.00002
E	D	0.00128	0.00479	0.00514	0.00189	0.00016	0.00002
ESE	D	0.00055	0.00297	0.00591	0.00269	0.00023	0.00000
SE	D	0.00076	0.00338	0.01244	0.01288	0.00194	0.00009
SSE	D	0.00085	0.00443	0.02333	0.03630	0.00801	0.00089
S	D	0.00124	0.00564	0.03025	0.07541	0.02557	0.00482
SSW	D	0.00030	0.00128	0.00543	0.01240	0.00388	0.00121
SW	D	0.00024	0.00144	0.00279	0.00459	0.00068	0.00021
WSW	D	0.00054	0.00155	0.00267	0.00283	0.00041	0.00016
W	D	0.00100	0.00263	0.00349	0.00374	0.00075	0.00007
WNW	D	0.00073	0.00258	0.00358	0.00406	0.00068	0.00005

NW	D	0.00111	0.00507	0.00616	0.00662	0.00064	0.00002
NNW	D	0.00125	0.00566	0.01023	0.01199	0.00160	0.00002
N	E	0.00000	0.00479	0.00740	0.00000	0.00000	0.00000
NNE	E	0.00000	0.00103	0.00240	0.00000	0.00000	0.00000
NE	E	0.00000	0.00171	0.00174	0.00000	0.00000	0.00000
ENE	E	0.00000	0.00176	0.00100	0.00000	0.00000	0.00000
E	E	0.00000	0.00317	0.00137	0.00000	0.00000	0.00000
ESE	E	0.00000	0.00290	0.00194	0.00000	0.00000	0.00000
SE	E	0.00000	0.00329	0.00854	0.00000	0.00000	0.00000
SSE	E	0.00000	0.00484	0.02112	0.00000	0.00000	0.00000
S	E	0.00000	0.00610	0.03872	0.00000	0.00000	0.00000
SSW	E	0.00000	0.00126	0.00502	0.00000	0.00000	0.00000
SW	E	0.00000	0.00084	0.00180	0.00000	0.00000	0.00000
WSW	E	0.00000	0.00100	0.00107	0.00000	0.00000	0.00000
W	E	0.00000	0.00176	0.00205	0.00000	0.00000	0.00000
WNW	E	0.00000	0.00153	0.00189	0.00000	0.00000	0.00000
NW	E	0.00000	0.00228	0.00279	0.00000	0.00000	0.00000
NNW	E	0.00000	0.00384	0.00345	0.00000	0.00000	0.00000
N	F	0.00654	0.01075	0.00000	0.00000	0.00000	0.00000
NNE	F	0.00123	0.00192	0.00000	0.00000	0.00000	0.00000
NE	F	0.00145	0.00201	0.00000	0.00000	0.00000	0.00000
ENE	F	0.00190	0.00260	0.00000	0.00000	0.00000	0.00000
E	F	0.00398	0.00603	0.00000	0.00000	0.00000	0.00000
ESE	F	0.00309	0.00377	0.00000	0.00000	0.00000	0.00000
SE	F	0.00348	0.00575	0.00000	0.00000	0.00000	0.00000
SSE	F	0.00652	0.01370	0.00000	0.00000	0.00000	0.00000
S	F	0.01082	0.02144	0.00000	0.00000	0.00000	0.00000
SSW	F	0.00191	0.00297	0.00000	0.00000	0.00000	0.00000
SW	F	0.00194	0.00297	0.00000	0.00000	0.00000	0.00000
WSW	F	0.00302	0.00393	0.00000	0.00000	0.00000	0.00000
W	F	0.00532	0.00626	0.00000	0.00000	0.00000	0.00000
WNW	F	0.00435	0.00578	0.00000	0.00000	0.00000	0.00000

NW	F	0.00679	0.00858	0.00000	0.00000	0.00000	0.00000
NNW	F	0.00620	0.00893	0.00000	0.00000	0.00000	0.00000

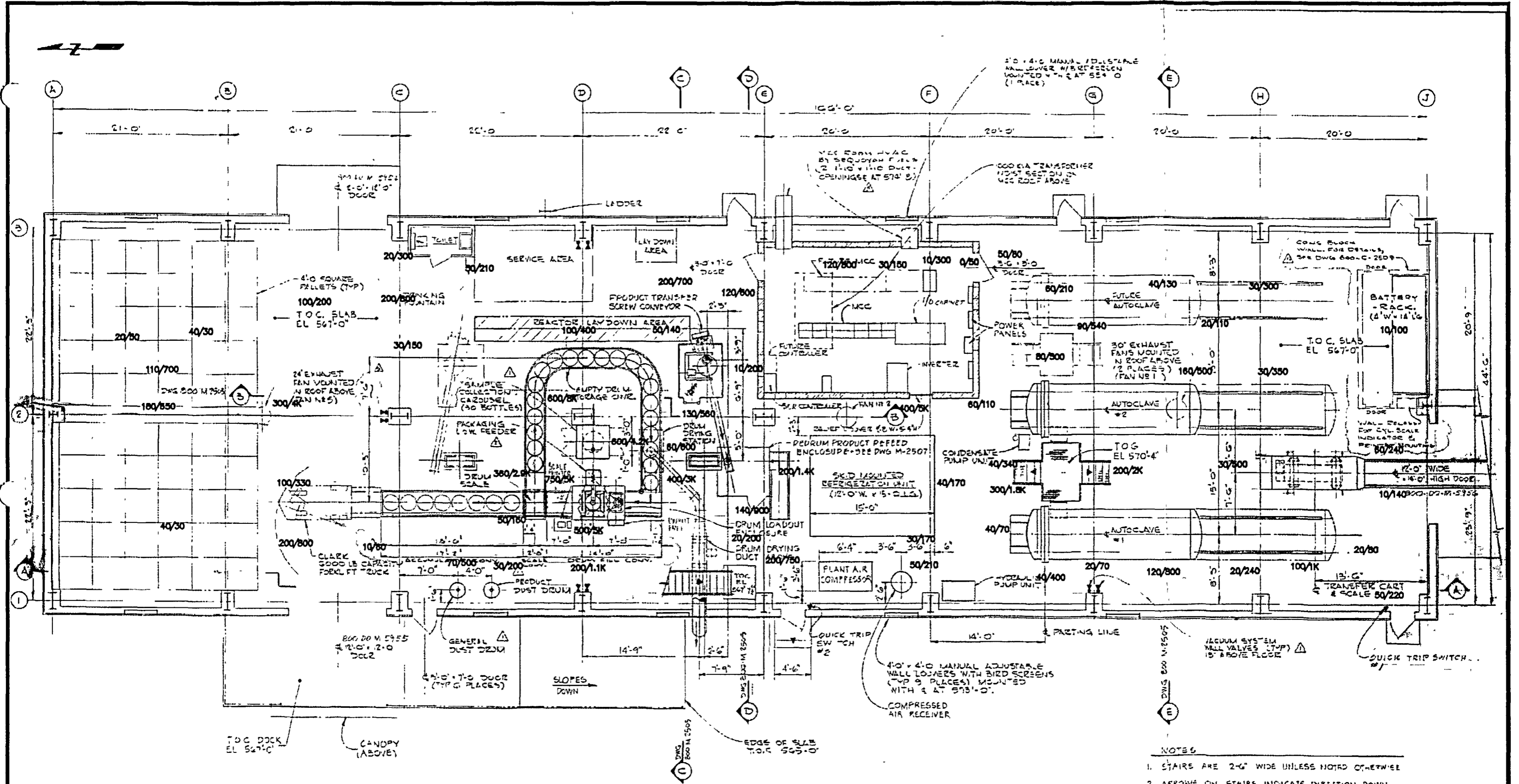
Attachment II

Structures And Equipment Survey Results

			Surface Contamination (dpm/100 cm ²)		Dose Rate (mrem/hr)			
			Removable		Contact		General Area	
Area	Figure No.	Unit No.	Alpha	Beta/Gamma	Beta/Gamma	Gamma	Beta/Gamma	Gamma
1st Level DUF4 Plant	II-1	29	750	8000	0.4	0.4	0.9	0.4
2nd Level DUF4 Plant	II-2	29	300	3000	1.5	<0.2	0.9	<0.2
3rd Level DUF4 Plant	II-2	29	300	4000	0.8	<0.2	1.4	<0.2
4th Level DUF4 Plant	II-2	29	500	3000	2.0	<0.2	1.2	<0.2
5th Level DUF4 Plant	II-2	29	300	2800	0.8	<0.2	0.4	<0.2
1st Level Misc. Digest	II-3	21	1200	4000	NR	NR	NR	NR
2nd Level Misc. Digest	II-3	21	400	5000	NR	NR	NR	NR
3rd Level Misc. Digest	II-4	21	600	8000	NR	NR	NR	NR
Raffinate/Centrifuge	II-5	17	500	500	0.4	<0.2	<0.2	<0.2
Process Hallway	II-6	1	700	2400	1.5	0.3	1.0	0.3
Utilities Area	II-6	1	100	150	1.0	<0.2	<0.2	<0.2
Maintenance Area	II-6	1	200	900	<0.2	<0.2	<0.2	<0.2
Old Warehouse	II-6	1	30	70	<0.2	<0.2	<0.2	<0.2
Cell Rework	II-6	1	600	1700	<0.2	<0.2	<0.2	<0.2
Cell Room #1	II-6	1	170	600	<0.2	<0.2	<0.2	<0.2
Cell Room #2	II-6	1	50	170	<0.2	<0.2	<0.2	<0.2
Old Laundry	II-6	1	90	120	<0.2	<0.2	<0.2	<0.2
UF6 Bldg Admin Area	II-6	1	20	40	<0.2	<0.2	<0.2	<0.2
Process Lab	II-6	1	500	1000	<0.2	<0.2	<0.2	<0.2
Product Shipping	II-6	1	200	700	1.2	0.2	1.7	0.2
1st Level Digestion	II-6	1	1600	6000	0.8	0.4	0.5	0.2
1st Level Sampling Plant	II-6	1	500	2000	3.4	0.8	1.7	<0.2
2nd Level Sampling Plant	II-7	1	600	1800	2.6	<0.2	3.4	0.2
3rd Level Sampling Plant	II-8	1	500	1300	1.7	0.2	2.2	1.5
4th Level Sampling Plant	II-9	1	800	1400	4.3	1.8	1.7	0.2
5th Level Sampling Plant	II-10	1	500	800	NR	NR	2.6	0.4
Roadway	II-11	N/A	30	50	0.2	<0.1	<0.1	0.2
1st Level Denitration	II-12	1	2000	8000	NR	NR	11.1	0.6
2nd Level Denitration	II-12	1	2000	11000	150.0	0.8	10.4	0.4
1st Lvl Reduction-Hydro	II-12	1	1000	10000	30.0	2.0	6.0	0.3
2nd Lvl Reduction-Hydro	II-12	1	1300	7000	6.0	0.2	6.9	0.3
3rd Lvl Reduction-Hydro	II-12	1	2000	8000	NR	NR	8.6	0.4
4th Lvl Reduction-Hydro	II-12	1	2000	12000	19.8	0.5	18.0	0.9
1st Level Fluorination	II-13	1	4000	20000	65.0	2.8	65.0	2.8
2nd Level Fluorination	II-13	1	2000	10000	120.0	1.6	69.0	0.8
3rd Level Fluorination	II-14	1	2000	11500	86.0	2.0	150.0	1.2
4th Level Fluorination	II-14	1	1000	9000	6.0	0.4	6.0	0.4
1st Level SX	II-15	2	1200	8000	0.9	<0.2	3.4	<0.2
2nd Level SX	II-15	2	1600	6900	12.0	<0.2	6.0	<0.2
Bechtel Building	II-16	30	70	80	<0.1	<0.1	<0.1	<0.1
Oil Storage Building	II-17	30	20	50	<0.1	<0.1	<0.1	<0.1
Solid Waste	II-18	10	100	400	2.0	<0.1	<0.1	<0.1

			Surface Contamination (dpm/100 cm ²)		Dose Rate (mrem/hr)			
			Removable		Contact		General Area	
Area	Figure No.	Unit No.	Alpha	Beta/Gamma	Beta/Gamma	Gamma	Beta/Gamma	Gamma
Hot Warehouse	II-19	30	20	40	<0.1	<0.1	<0.1	<0.1
Cooling Tower**		2	2000	20	9.0	NR	2.6	NR
2nd Level Digestion**		1	1000	2600	1.4	0.8	1.2	0.4
3rd Level Digestion**		1	750	2300	6.0	1.0	2.0	0.4

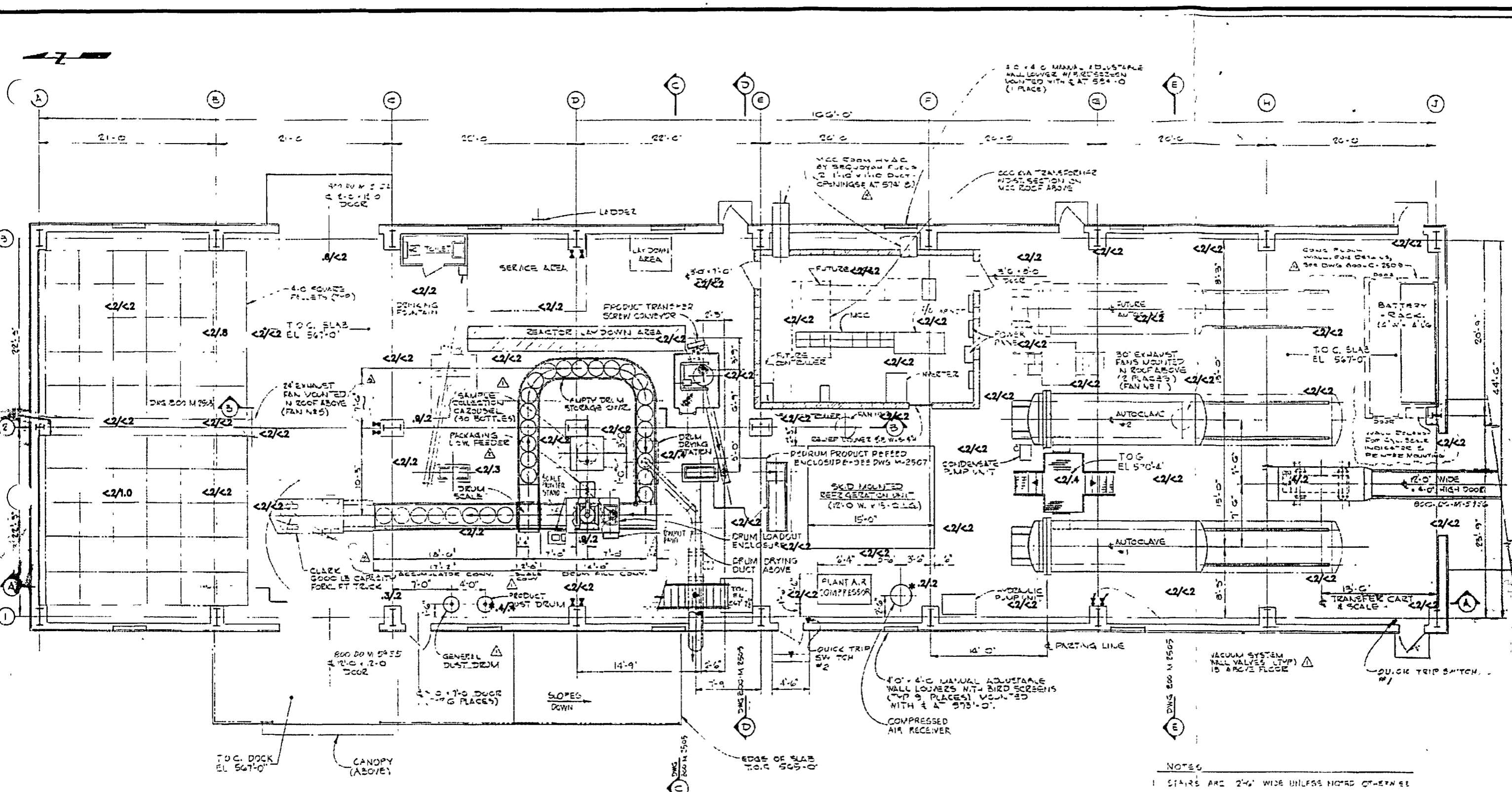
NR - Not Recorded
 ** No Drawing Supplied



GROUND FLOOR PLAN
T.O.C. EL. 567'-0"

- NOTES
1. STAIRS ARE 2'-6" WIDE UNLESS NOTED OTHERWISE
 2. ARROWS ON STAIRS INDICATE DIRECTION DOWN.

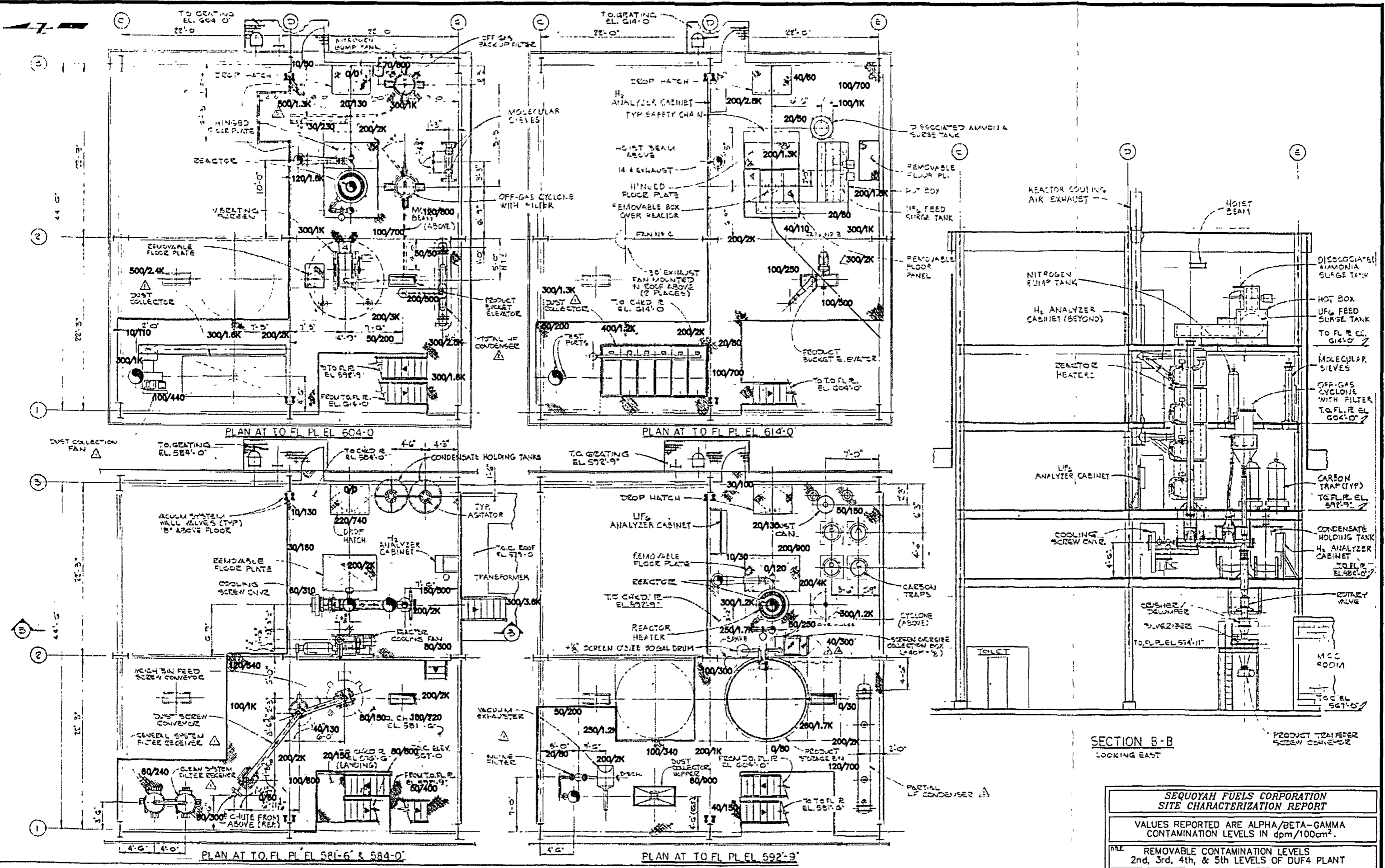
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ²	
TITLE: REMOVABLE CONTAMINATION LEVELS 1st. LEVEL OF DUF4 PLANT	
FILENAME: 800M2502	PREPARED BY: SFC
REV. 0 1/29/96	FIGURE NO. 11-1
DATE 1/29/96	



GROUND FLOOR PLAN
T.O.C. EL. 567'-0"

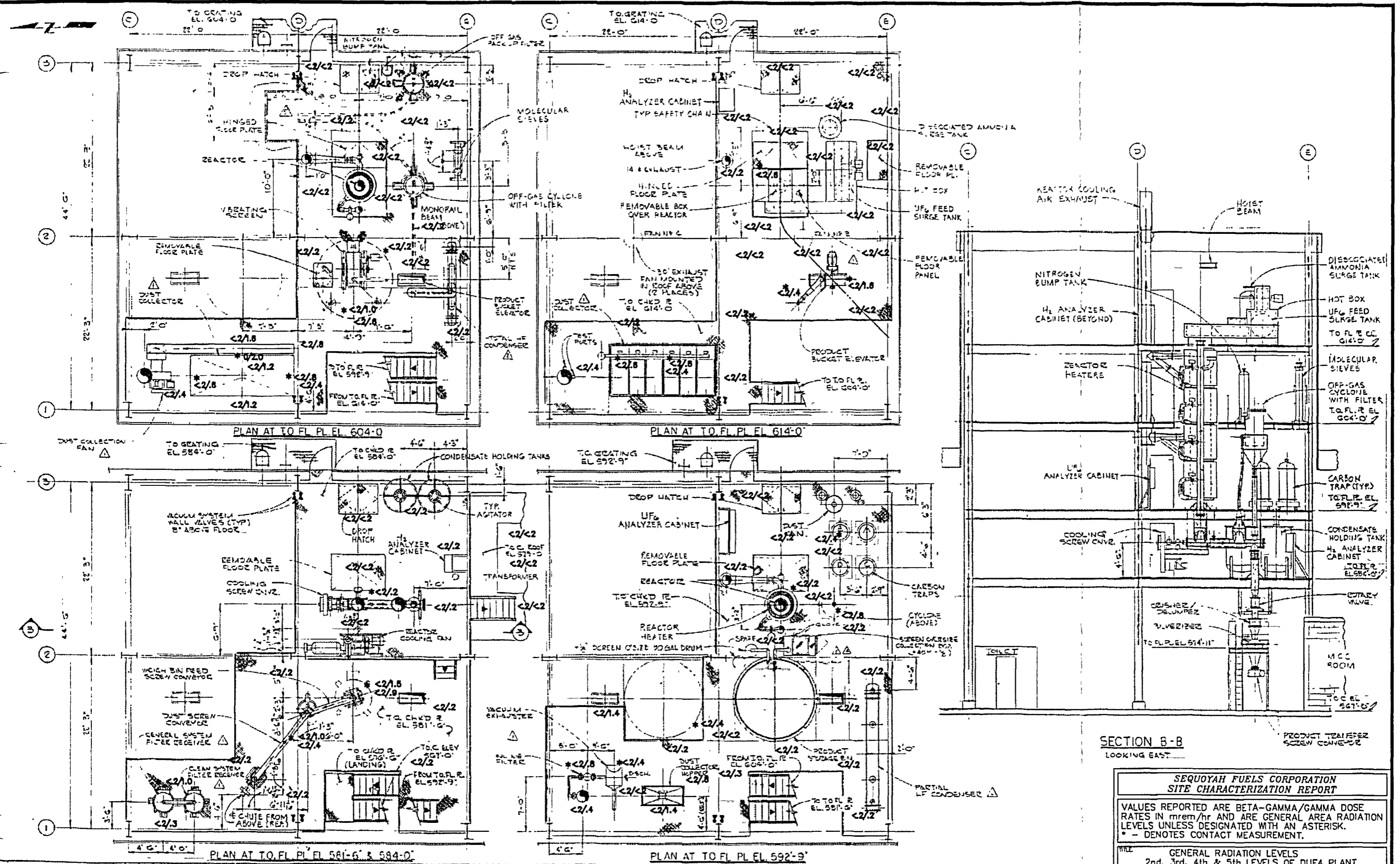
- NOTES
- 1 STAIRS ARE 2'-6" WIDE UNLESS NOTED OTHERWISE
 - 2 ARROWS ON STAIRS INDICATE DIRECTION DOWN

SEQUOIA FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS 1st. LEVEL OF DUF4 PLANT	
FILENAME 800M2502	PREPARED BY SFC
REV. 0	FIGURE NO.11-1A
DATE 1/29/96	

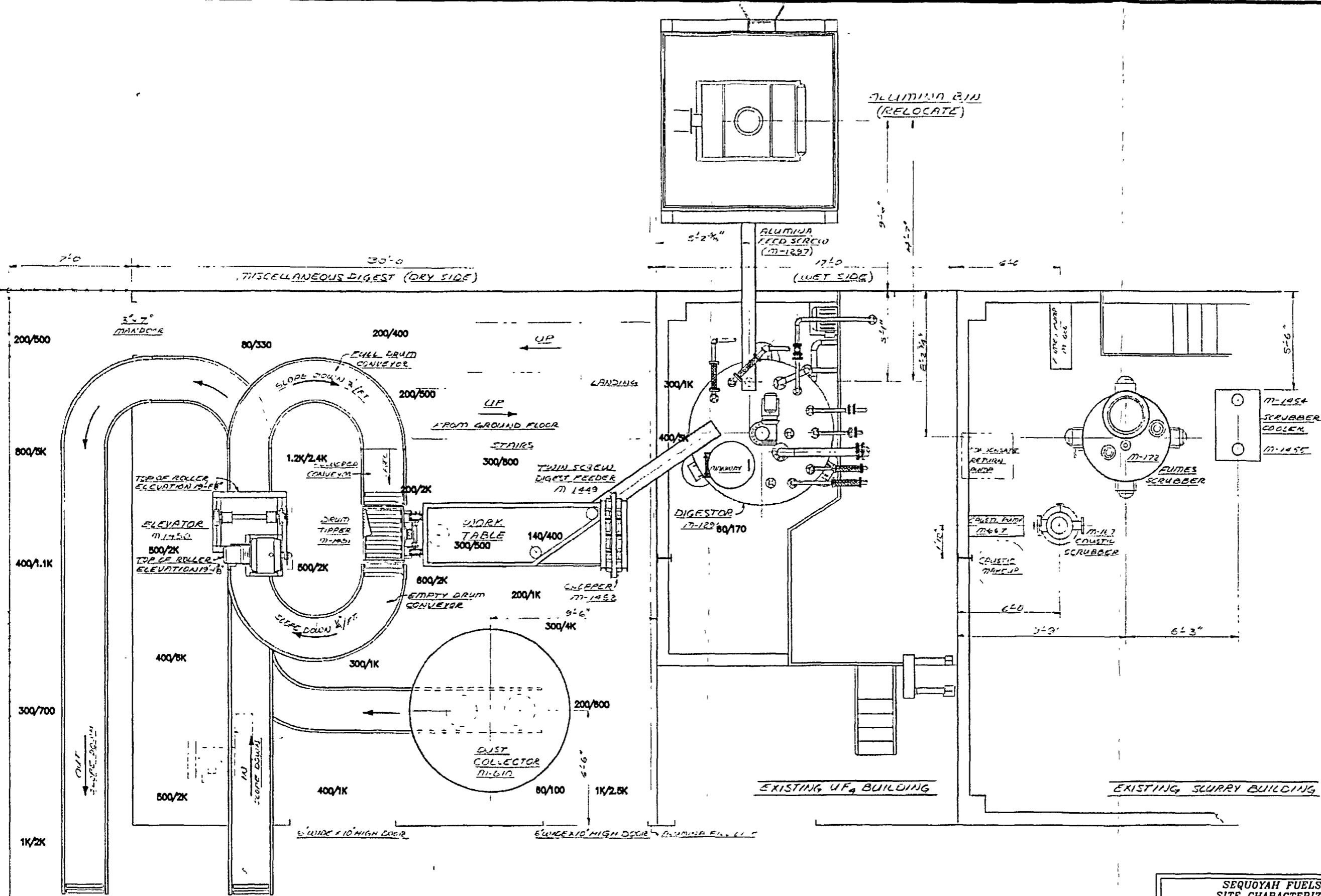


SECTION B-B
LOOKING EAST

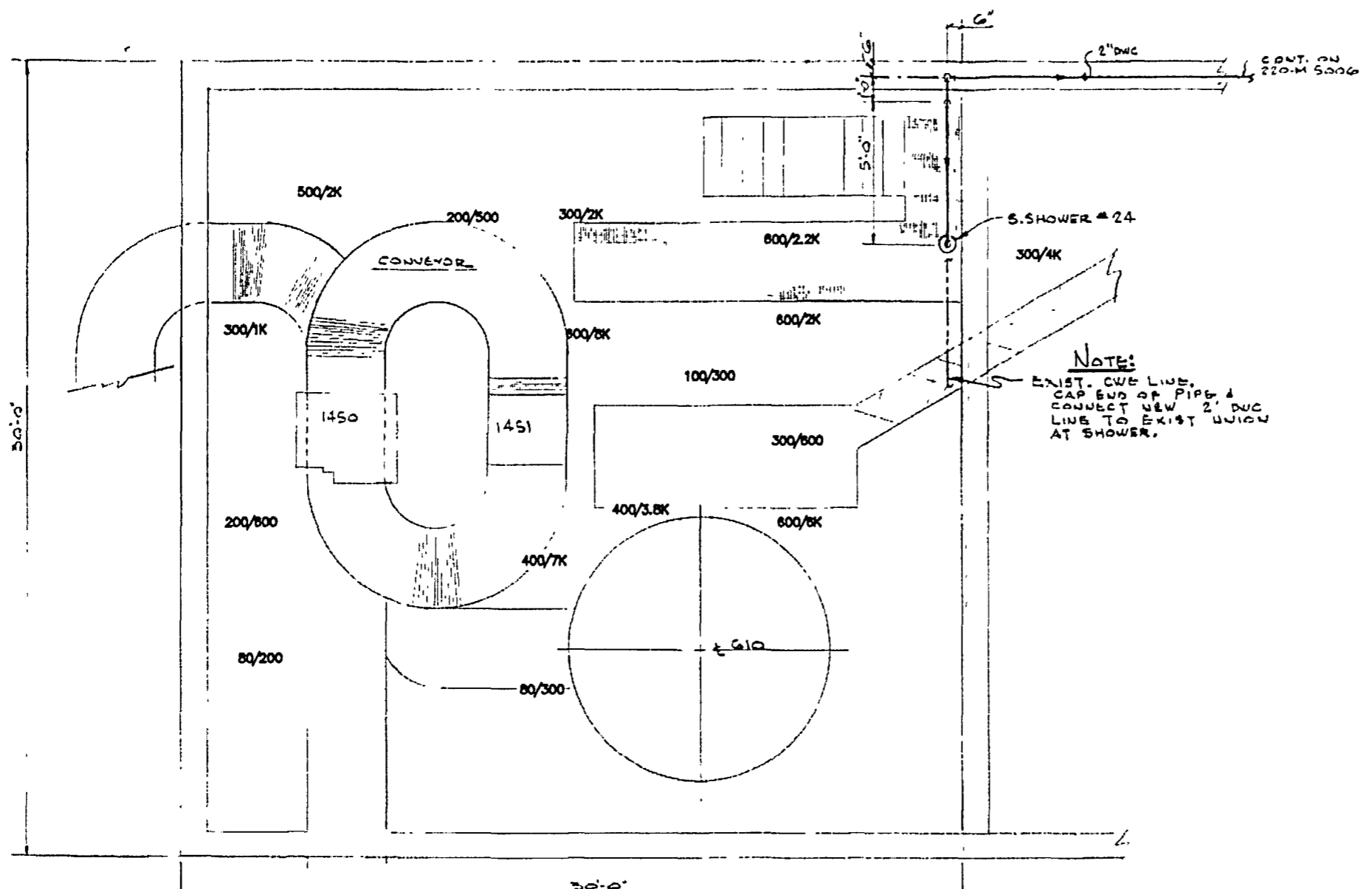
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE: REMOVABLE CONTAMINATION LEVELS 2nd, 3rd, 4th, & 5th LEVELS OF DUF4 PLANT	
FILENAME: 800M2503	PREPARED BY: SFC
REV. 0	FIGURE NO.11-2
DATE: 1/29/96	



SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE	GENERAL RADIATION LEVELS
FILENAME	800M2503
PREPARED BY	SFC
REV. 0	FIGURE NO.11-2A
DATE	1/29/96

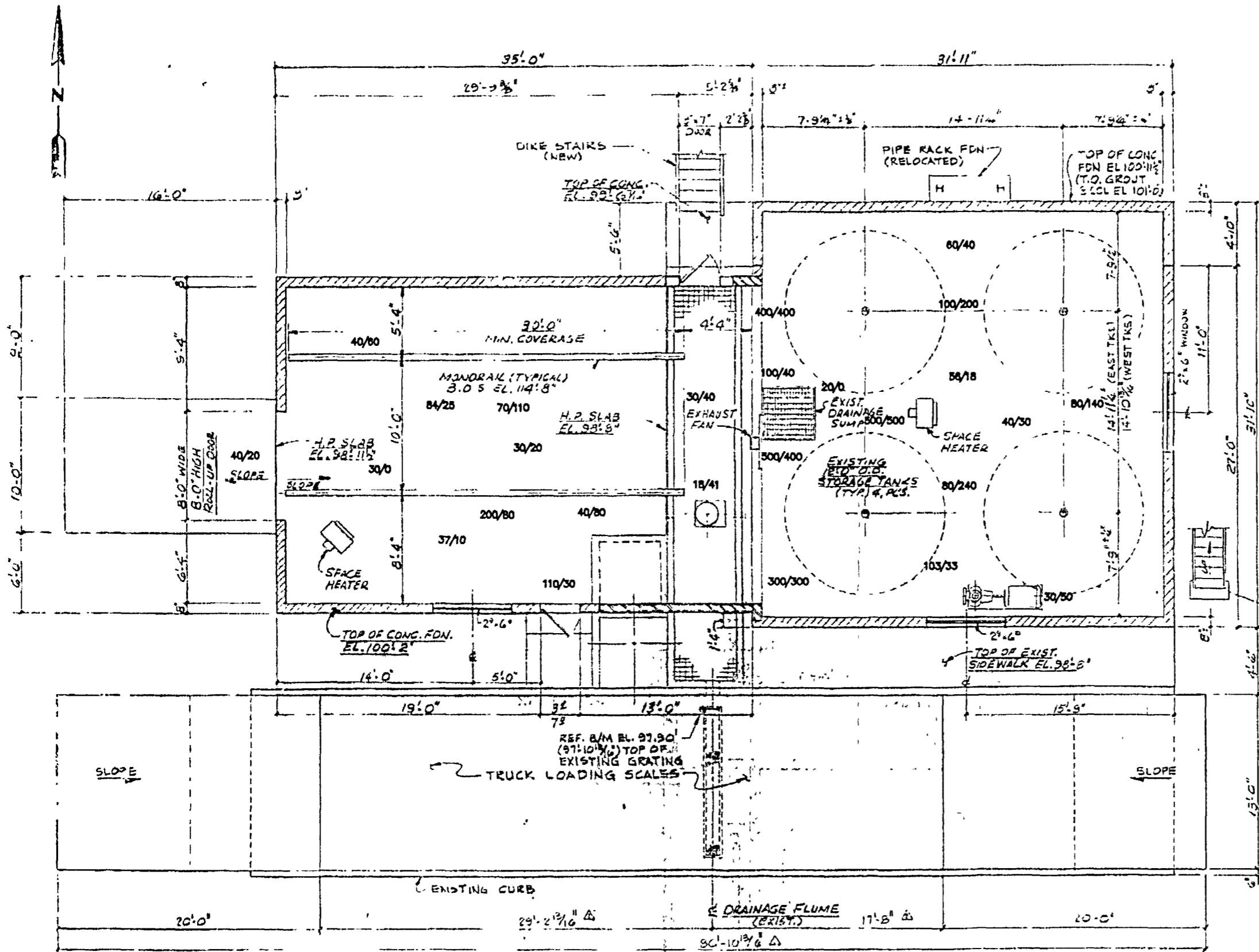


SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE: REMOVABLE CONTAMINATION LEVELS 1st, & 2nd LEVEL MISCELLANEOUS DIGEST	
FILENAME: 230M2009	PREPARED BY: SFC
REV. 0	FIGURE NO.11-3
DATE 1/3/96	

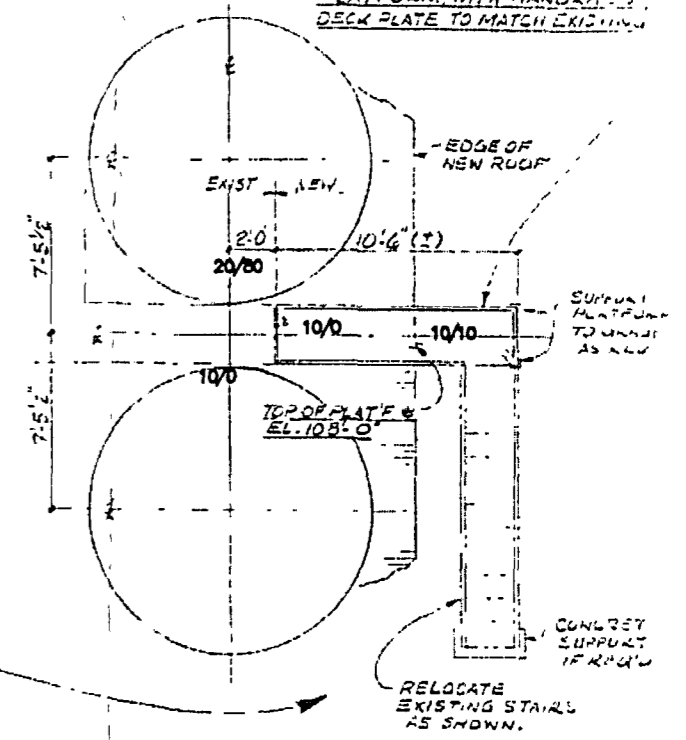


PLAN
3rd LEVEL MISC. DIGEST
SLURRY BLD

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE: REMOVABLE CONTAMINATION LEVELS 3 rd LEVEL MISCELLANEOUS DIGEST	
FILENAME: 230M5012	PREPARED BY: SFC
REV. 0	FIGURE NO.11-4
DATE 1/3/96	



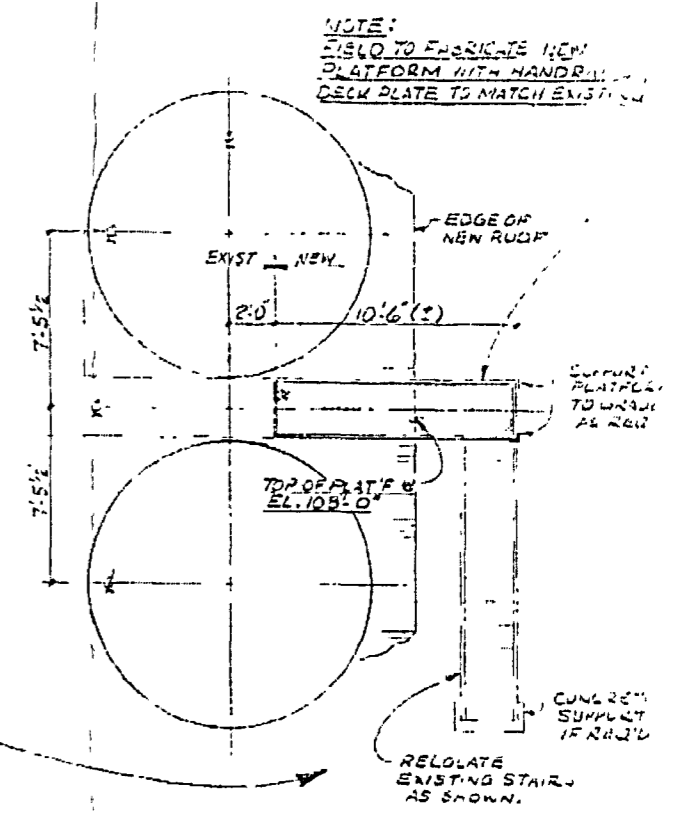
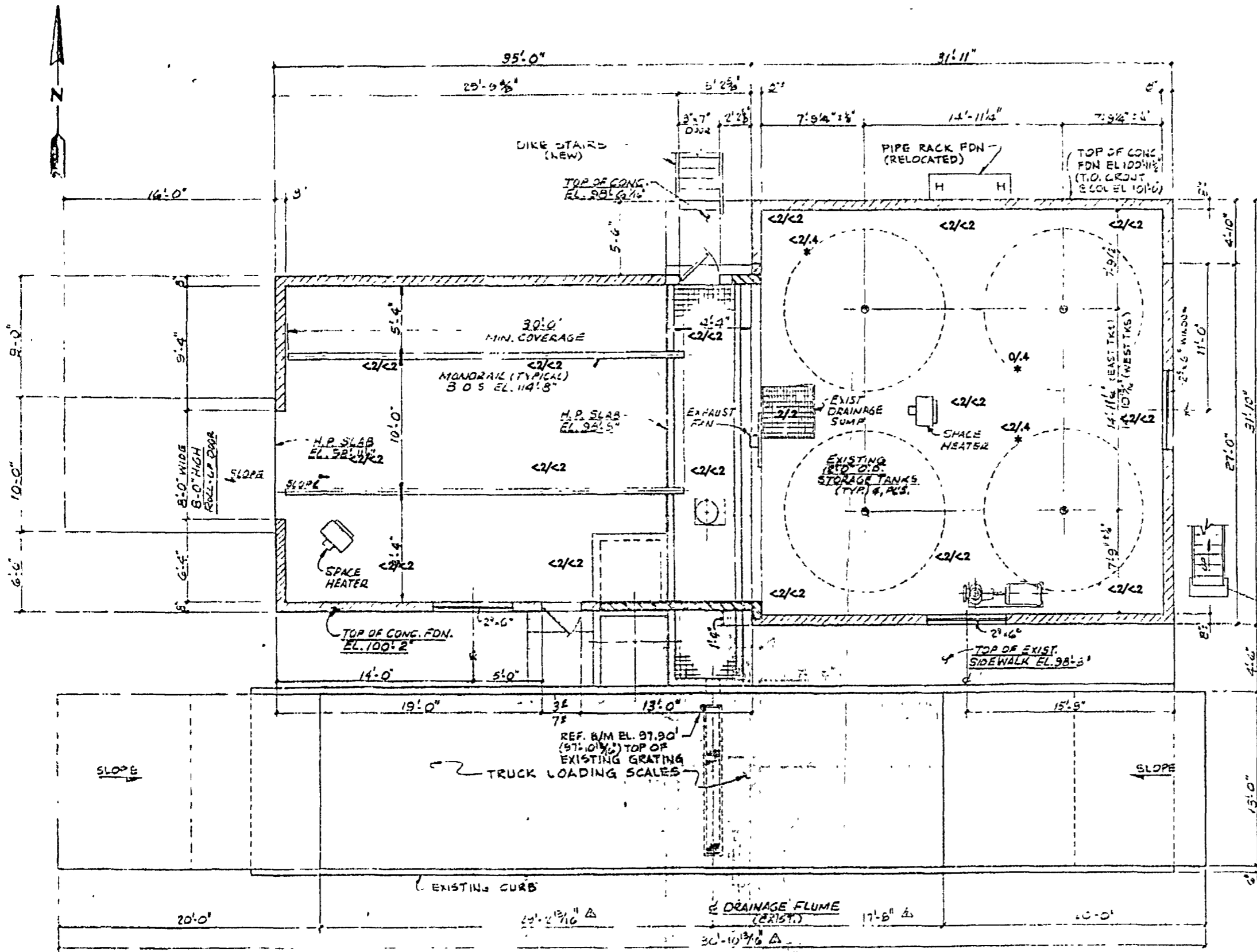
NOTE:
FIELD TO FABRICATE NEW
PLATFORM WITH HANDRAILS &
DECK PLATE TO MATCH EXISTING



PARTIAL PLAN @ EL. 105'-0"

REFERENCE
FOR ELEVATIONS & DETAILS SEE
DRAWING 290-C-3011.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS THORIUM CONTROLLED AREA	
FILENAME 290C3010	PREPARED BY SFC
REV. 0	FIGURE NO. 11-5
DATE 1/29/96	

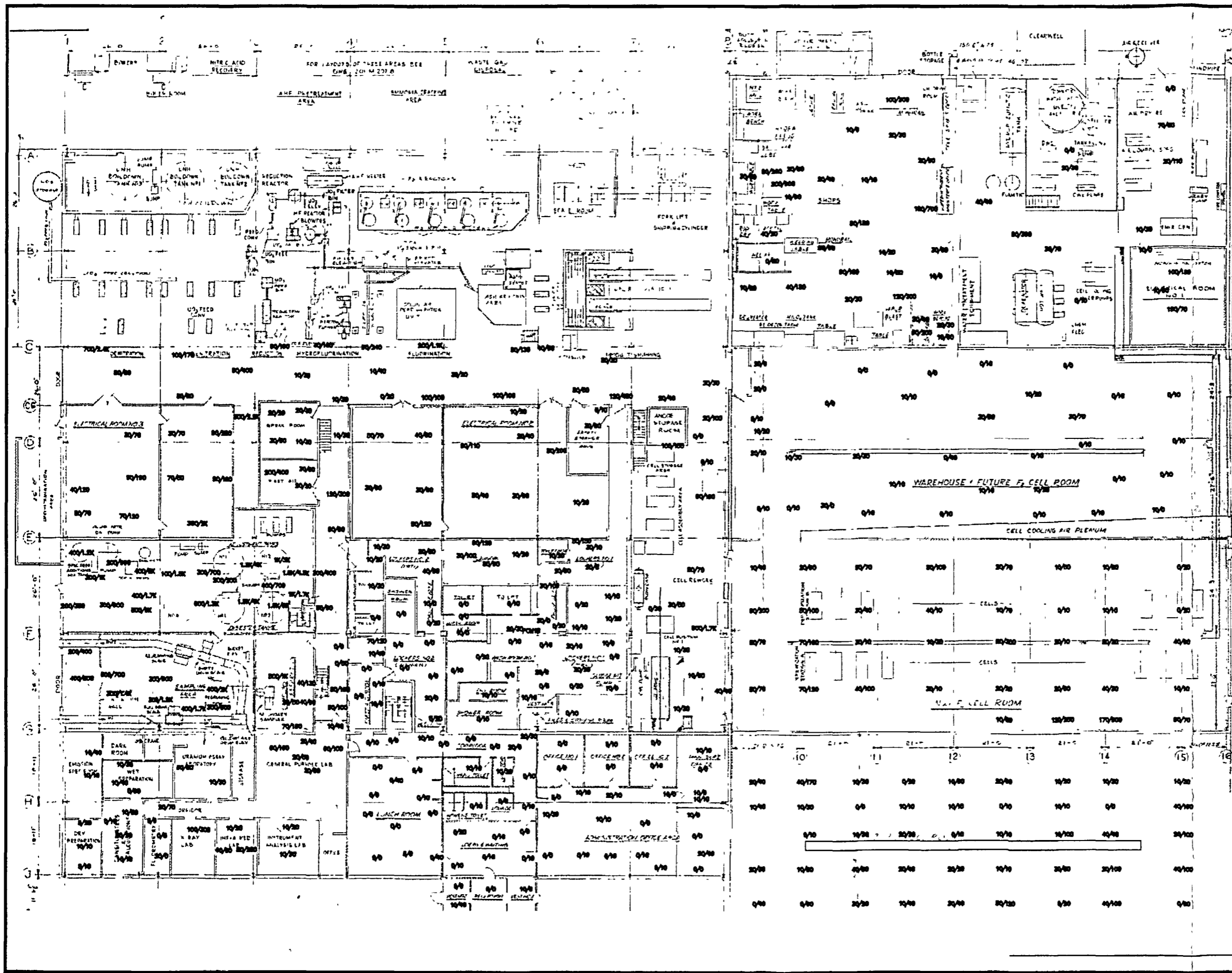


NOTE:
 1. ISLO TO FABRICATE NEW PLATFORM WITH HANDRAILS
 2. DECK PLATE TO MATCH EXISTING

PARTIAL PLAN @ EL. 108'-0"

REFERENCE
 FOR ELEVATIONS & DETAILS SEE
 DRAWING 290-C-3011.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE: GENERAL RADIATION LEVELS THORIUM CONTROLLED AREA	
FILENAME: 290C3010	PREPARED BY: SFC
REV 0	FIGURE NO.11-5A
DATE: 1/29/96	



SEQUOYAH FUELS CORPORATION
SITE CHARACTERIZATION REPORT

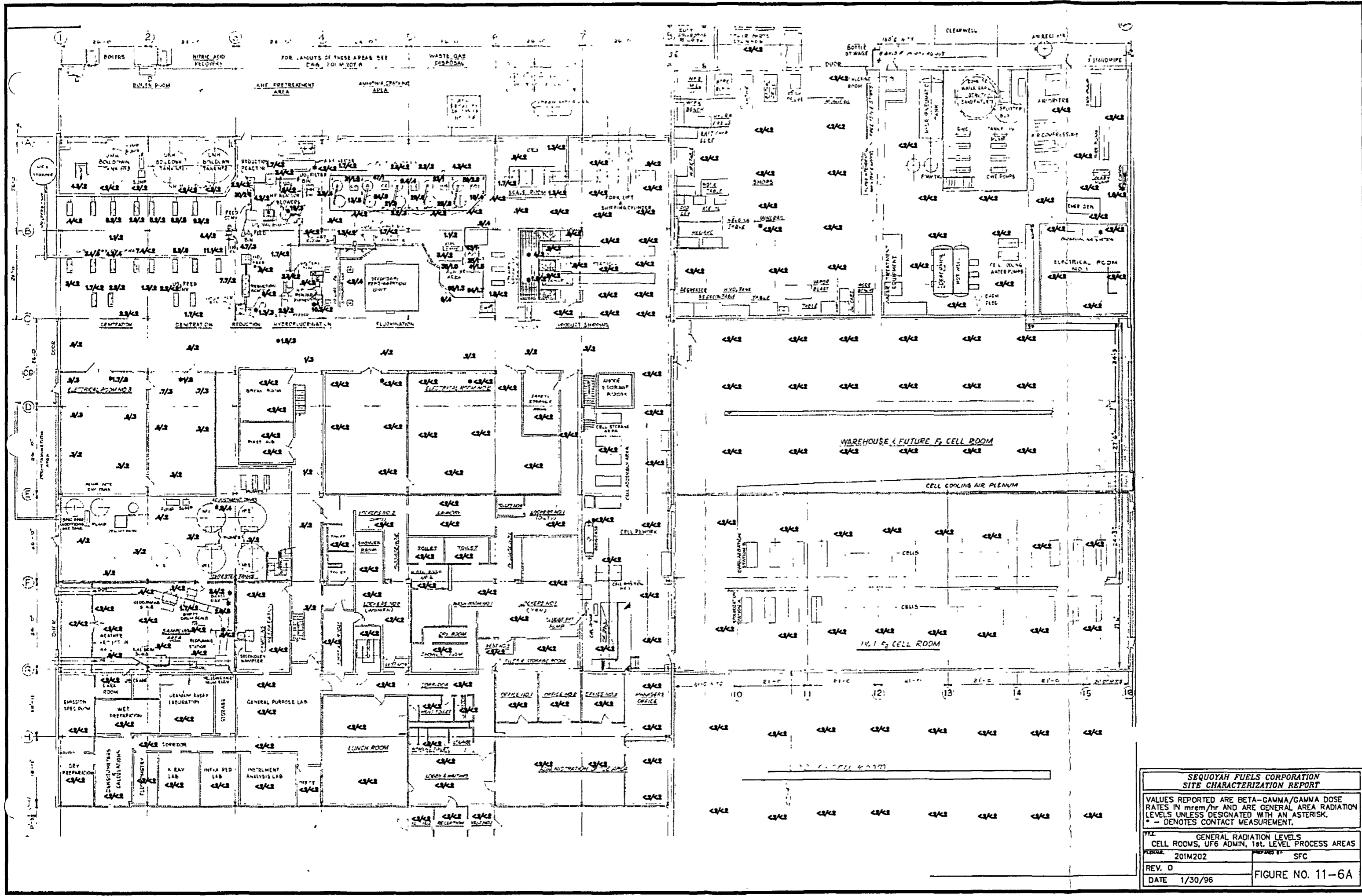
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm².

FIELD: REMOVABLE CONTAMINATION LEVELS
 CELLROOMS, UP6 ADMIN & 1st LEVEL PROCESS

FILENAME: 201M202 PROJECT BY: SFC

REV. 0

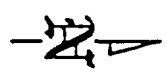
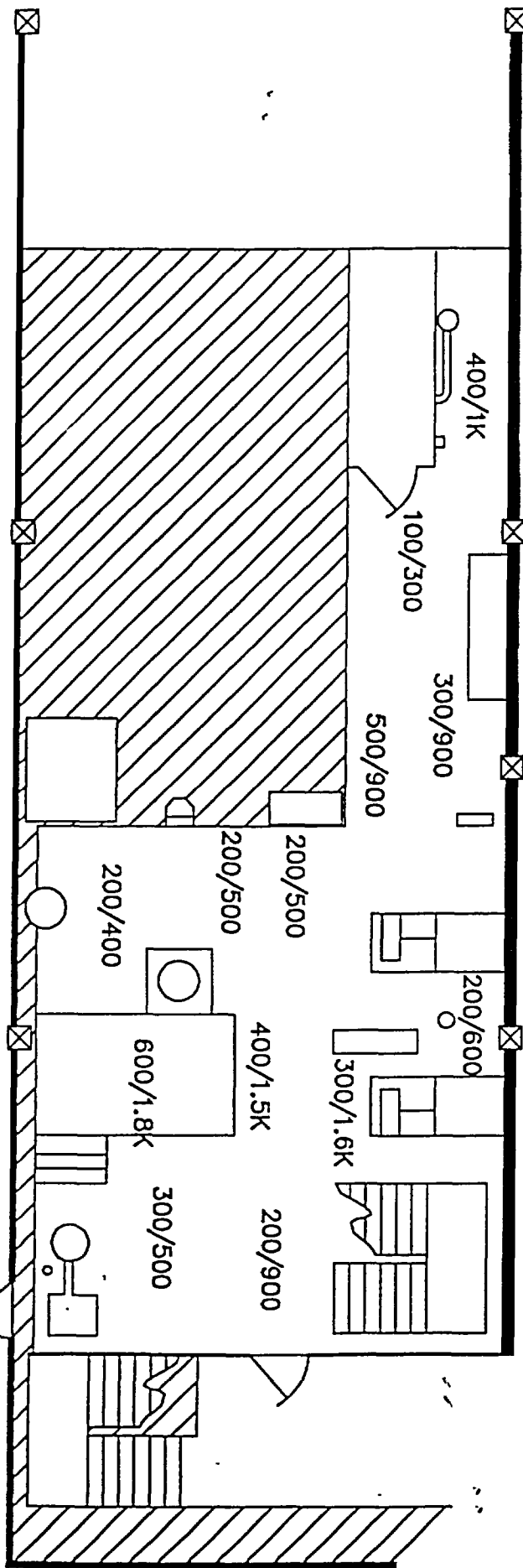
DATE: 1/31/96 FIGURE NO. 11-6



SEQUOYAH FUELS CORPORATION
SITE CHARACTERIZATION REPORT

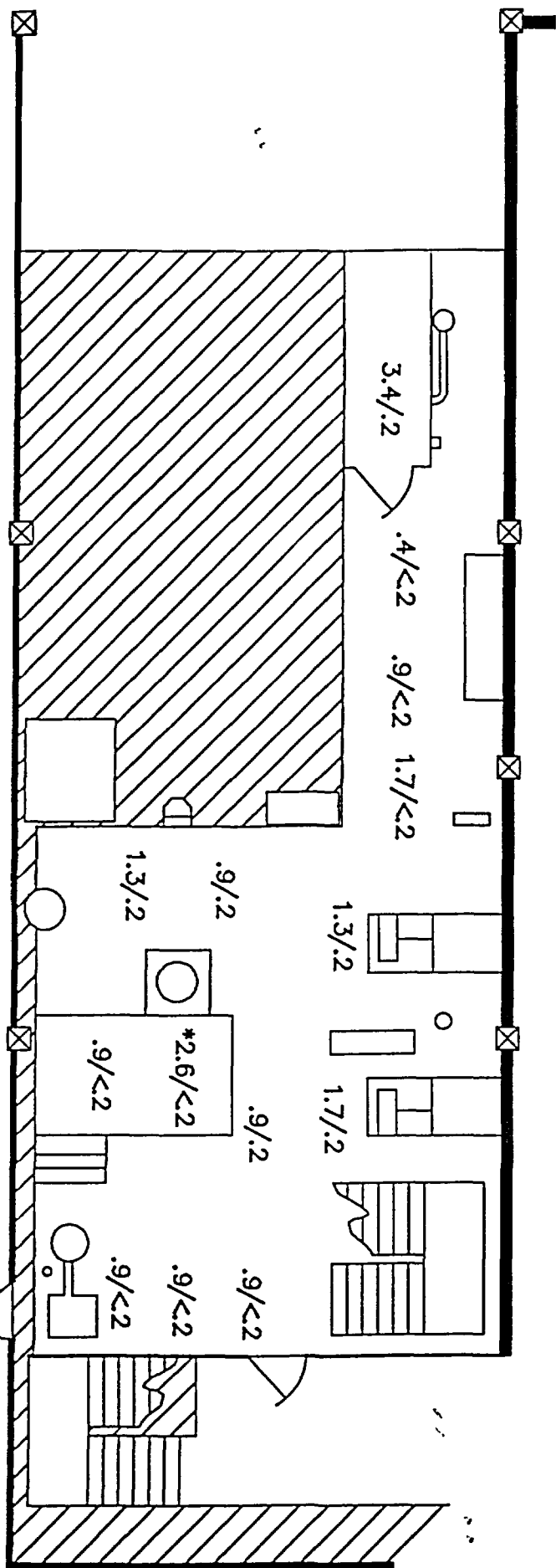
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK.
 * - DENOTES CONTACT MEASUREMENT.

TITLE: GENERAL RADIATION LEVELS CELL ROOMS, UF6 ADMIN, 1st. LEVEL PROCESS AREAS	
PLANS: 201M202	PREPARED BY: SFC
REV. 0	FIGURE NO. 11-6A
DATE 1/30/96	



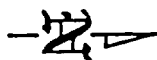
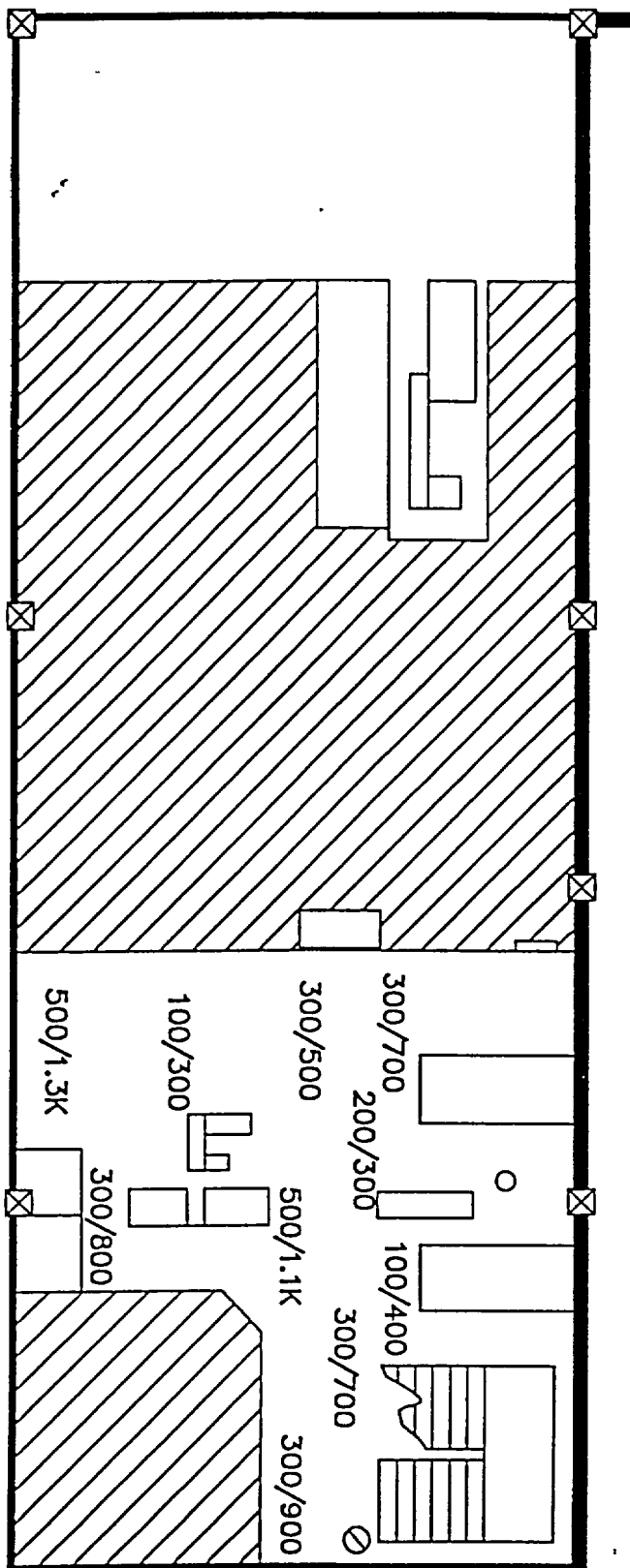
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS SAMPLING PLANT 2nd LEVEL	
FILENAME RL-CL-05	PREPARED BY SFC
REV. 0	FIGURE NO. II-7
DATE 1/29/96	



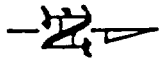
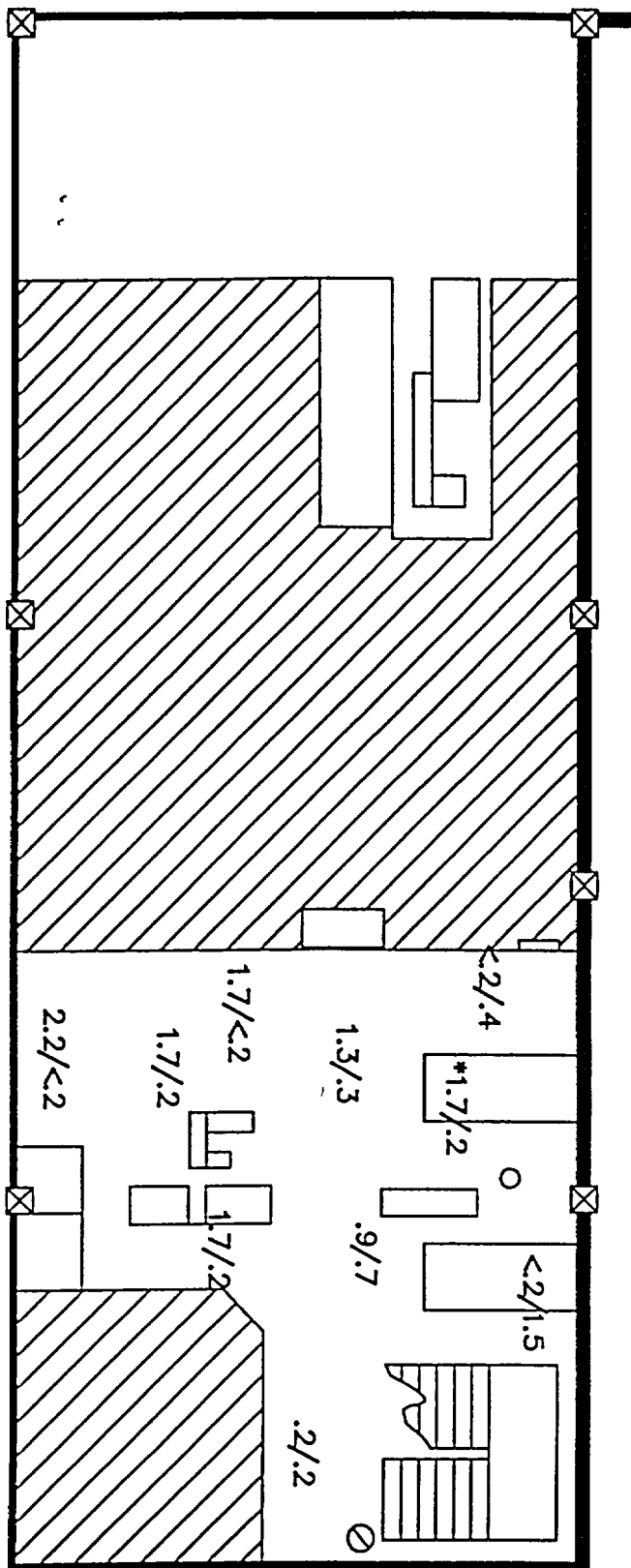
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS SAMPLING PLANT 2nd LEVEL	
FILENAME RL-CL-05	PREPARED BY: SFC
REV. 0	FIGURE NO. II-7A
DATE 1/29/96	



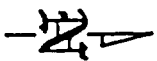
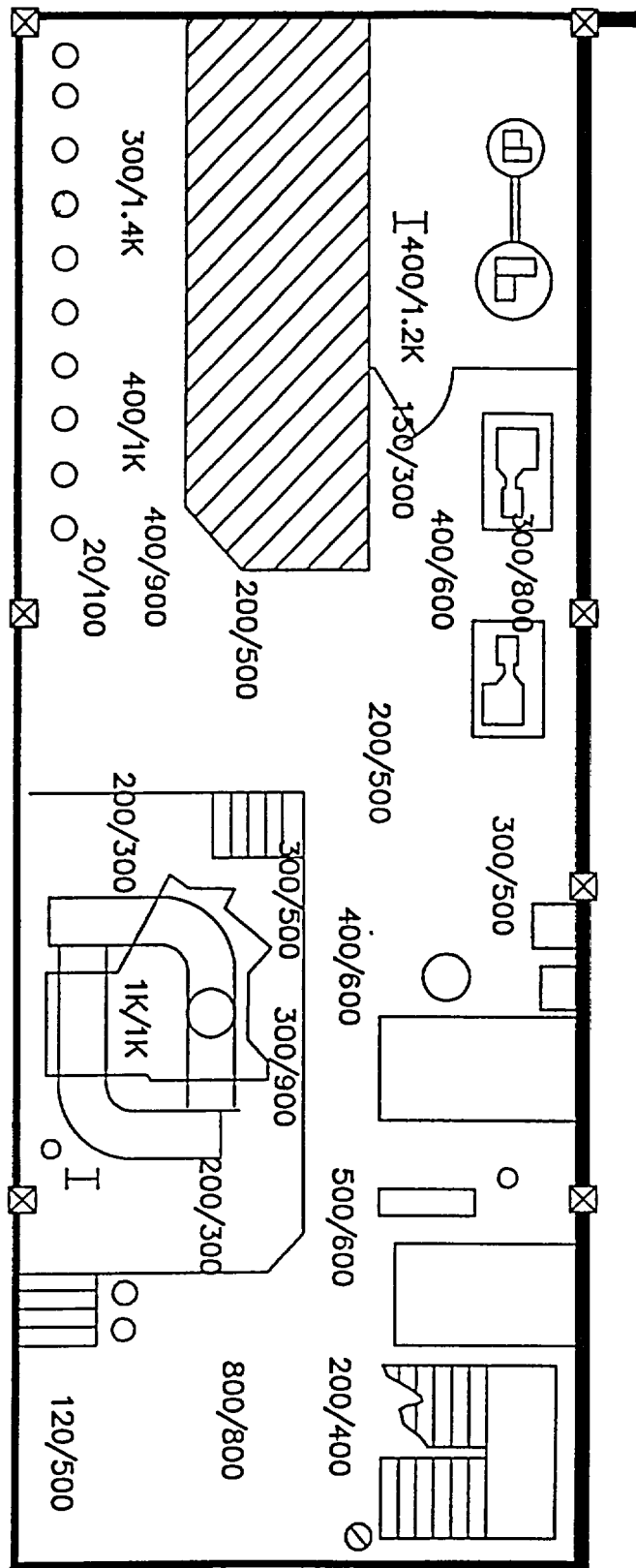
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS SAMPLING PLANT 3rd LEVEL	
FILENAME RL-CL-06	PREPARED BY SFC
REV. 0	FIGURE NO. II-8
DATE 1/29/96	



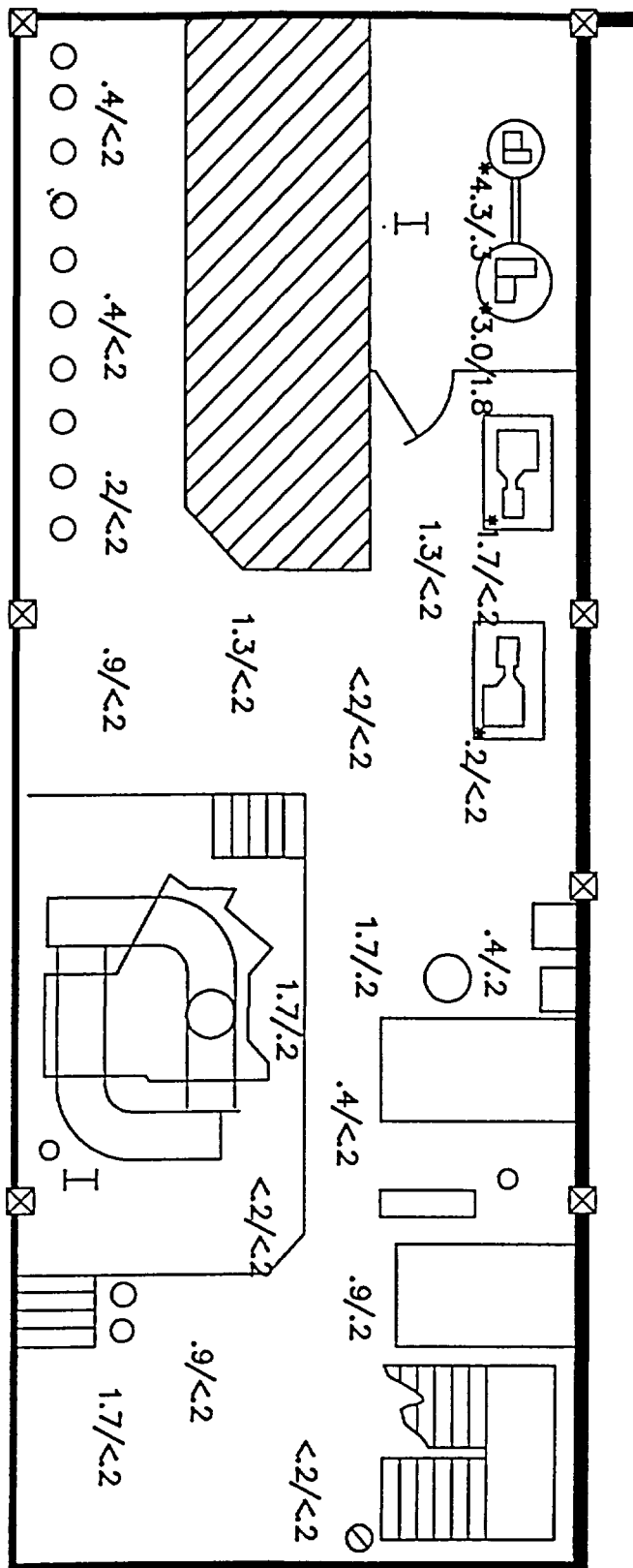
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS SAMPLING PLANT 3rd LEVEL	
FILENAME RL-CL-06	PREPARED BY: SFC
REV. 0	FIGURE NO. II-8A
DATE 1/8/96	



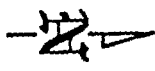
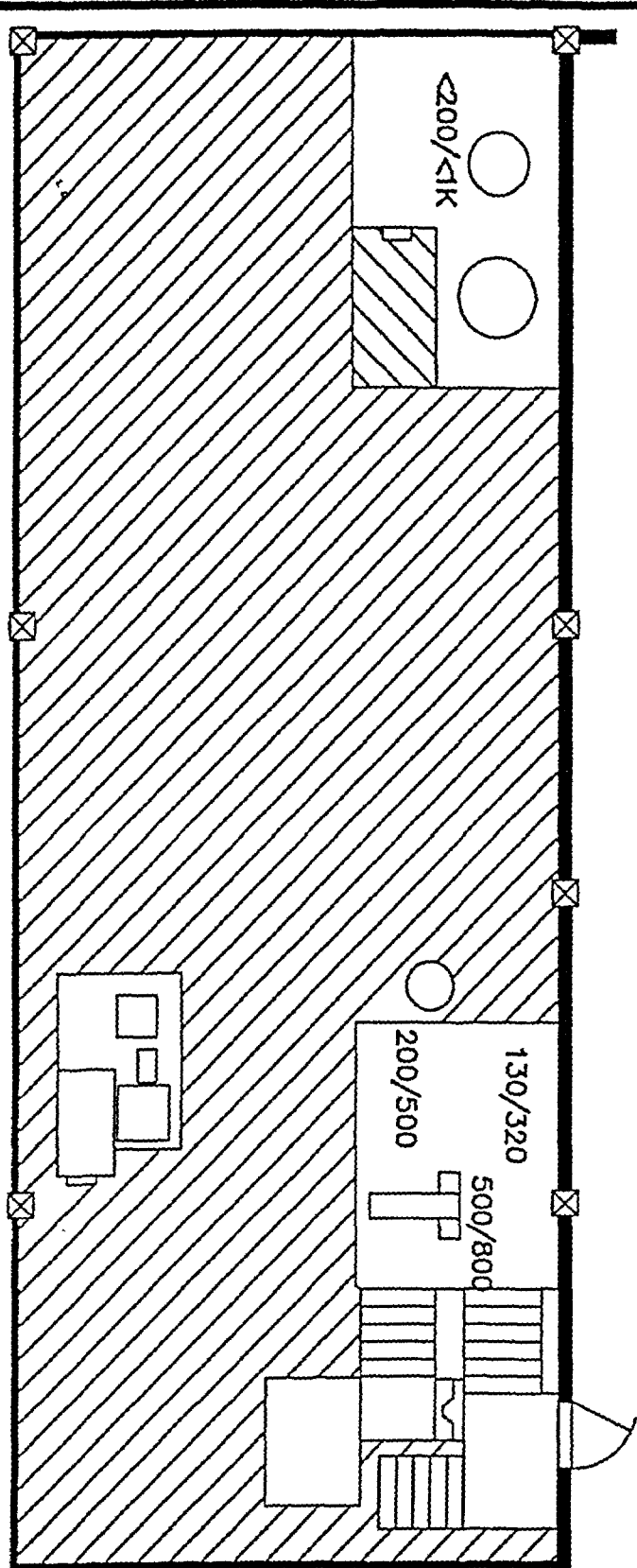
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS SAMPLING PLANT 4th LEVEL	
FILENAME RL-CL-07	PREPARED BY: SFC
REV. 0	FIGURE NO. II-9
DATE 1/29/96	



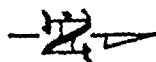
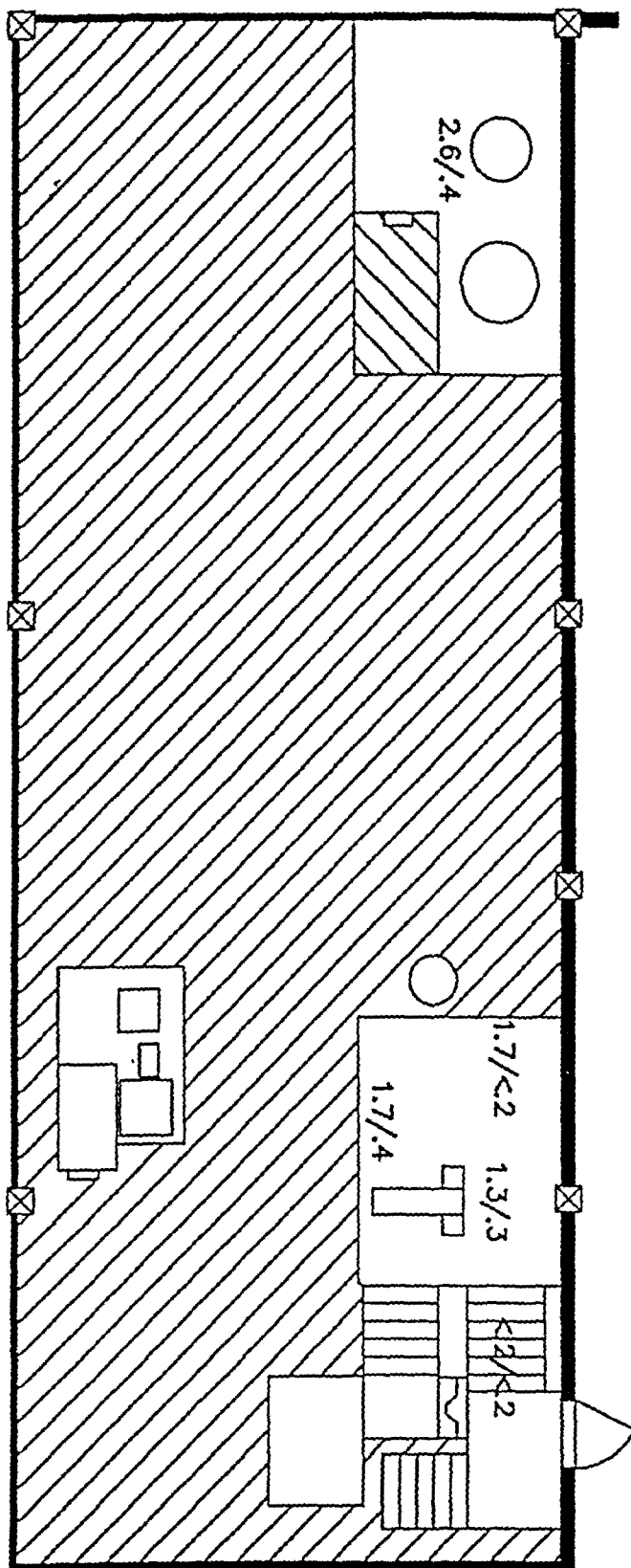
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS SAMPLING PLANT 4th LEVEL	
FILENAME RL-CL-07	PREPARED BY SFC
REV. 0	FIGURE NO. II-9A
DATE 1/26/96	



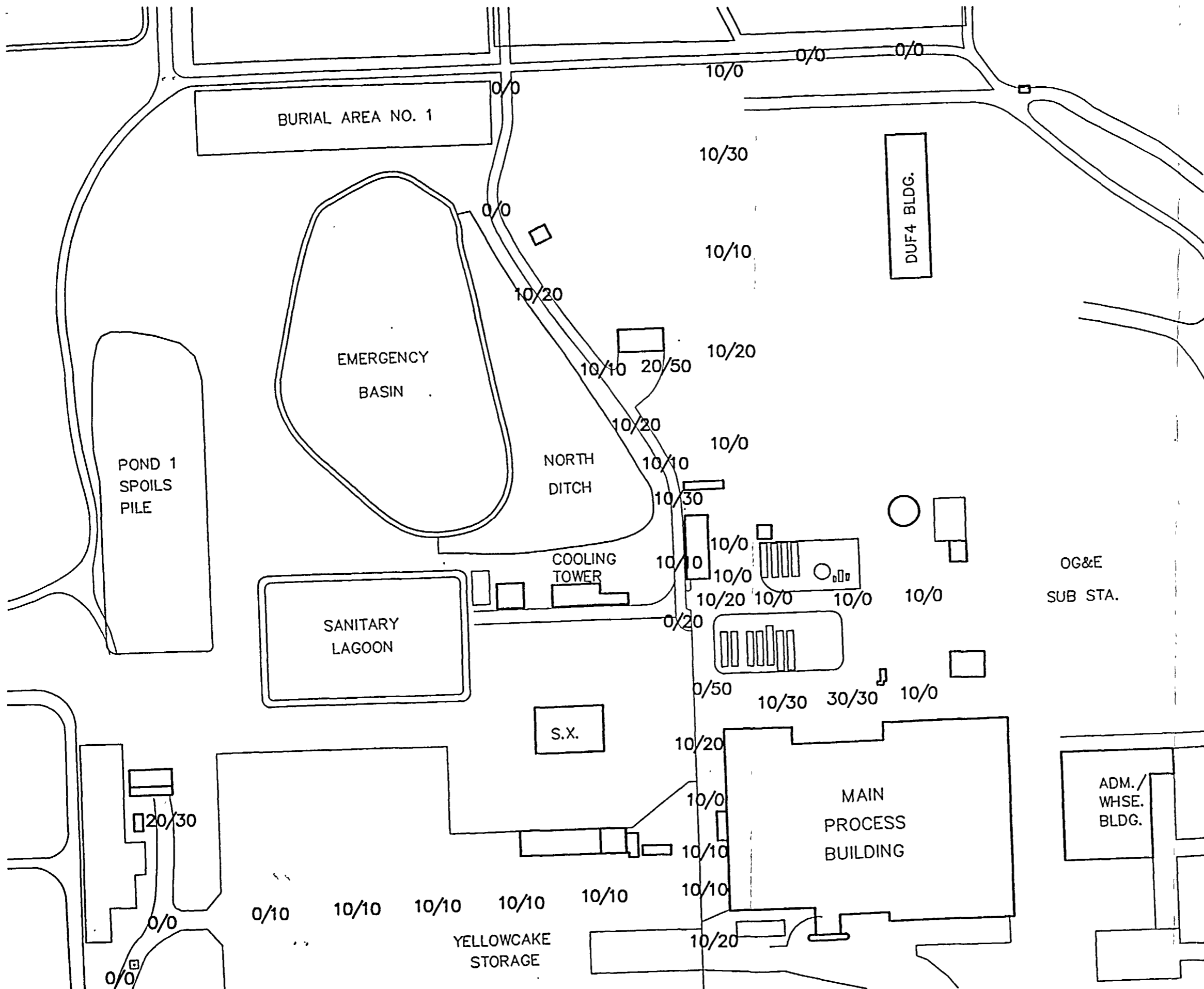
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS SAMPLING PLANT 5th LEVEL	
FILENAME RL-CL-08	PREPARED BY SFC
REV. 0	FIGURE NO. II-10
DATE 1/8/96	

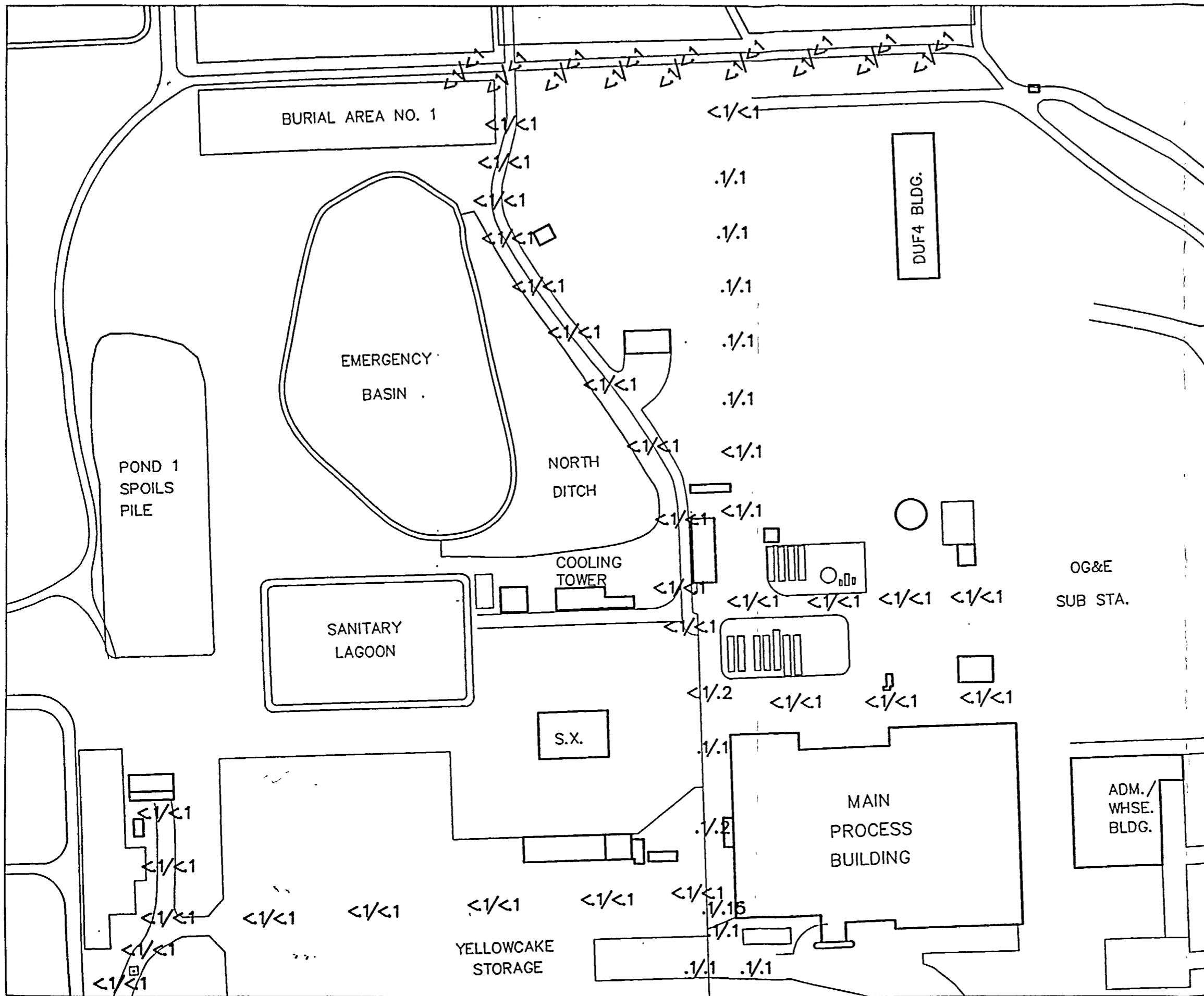


N.T.S.

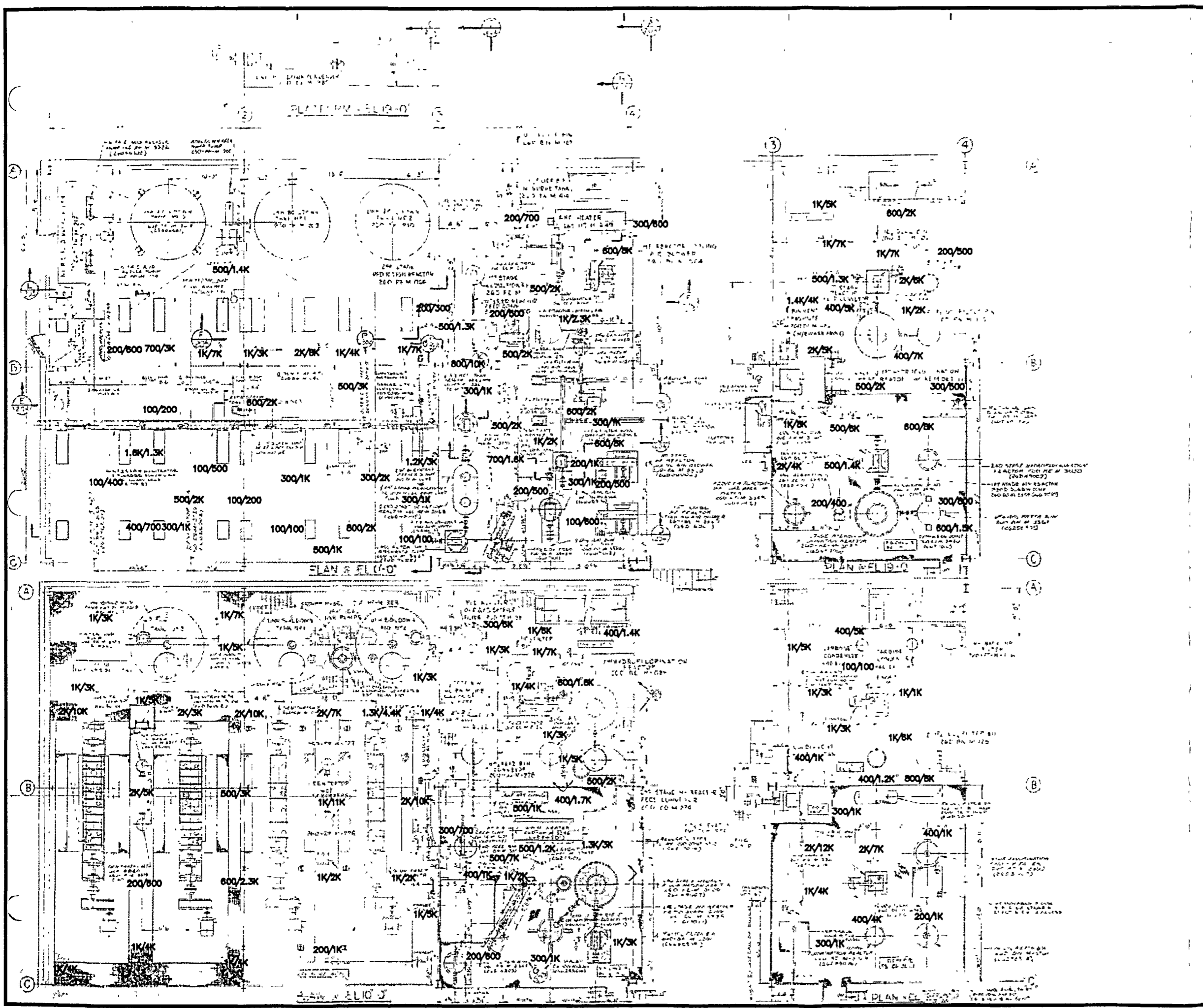
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS SAMPLING PLANT 5th LEVEL	
FILENAME RL-CL-08	PREPARED BY SFC
REV. 0	FIGURE NO. II-10A
DATE 1/8/96	



SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
REMOVABLE CONTAMINATION LEVELS RESTRICTED AREA ROADWAY	
REV. 0	DATE 1/8/96
RL-CL-09	SFC
FIGURE II-11	



SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
GENERAL RADIATION LEVELS RESTRICTED AREA ROADWAY	
FORM RL-CL-09	PREPARED BY SFC
REV. 0	FIGURE II-11A
DATE 1/8/96	



SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE: REMOVABLE CONTAMINATION LEVELS DENITRATION, REDUCTION, & HYDROFLUORINATION	
FILENAME: 260M202	PREPARED BY: SFC
REV. 0	
DATE: 1/29/96	FIGURE NO. 11-12

PLAN 6 FL10-0

PLAN 6 FL10-0

PLAN 6 FL10-0

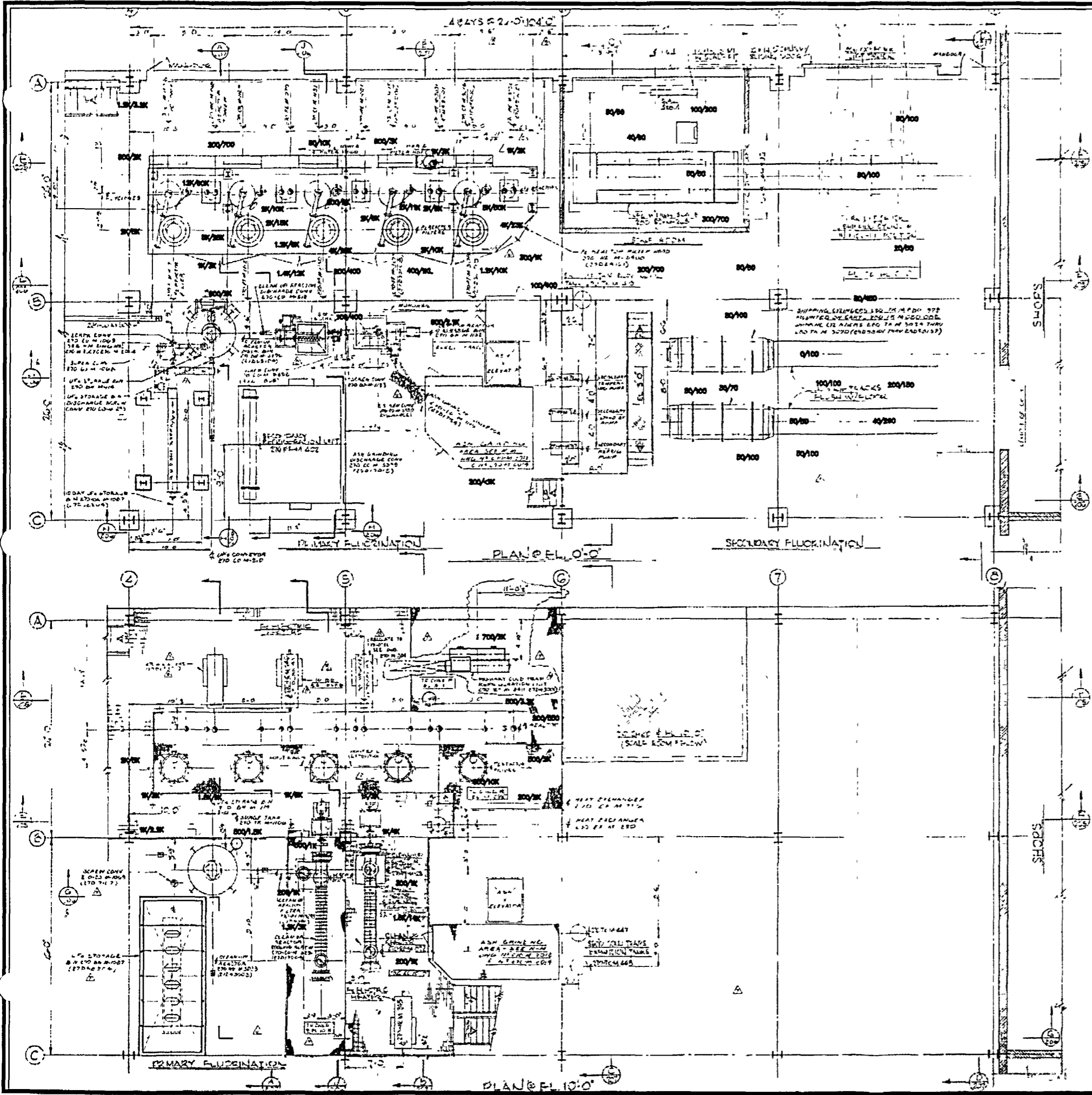
PLAN 6 FL10-0

PLAN 6 FL10-0

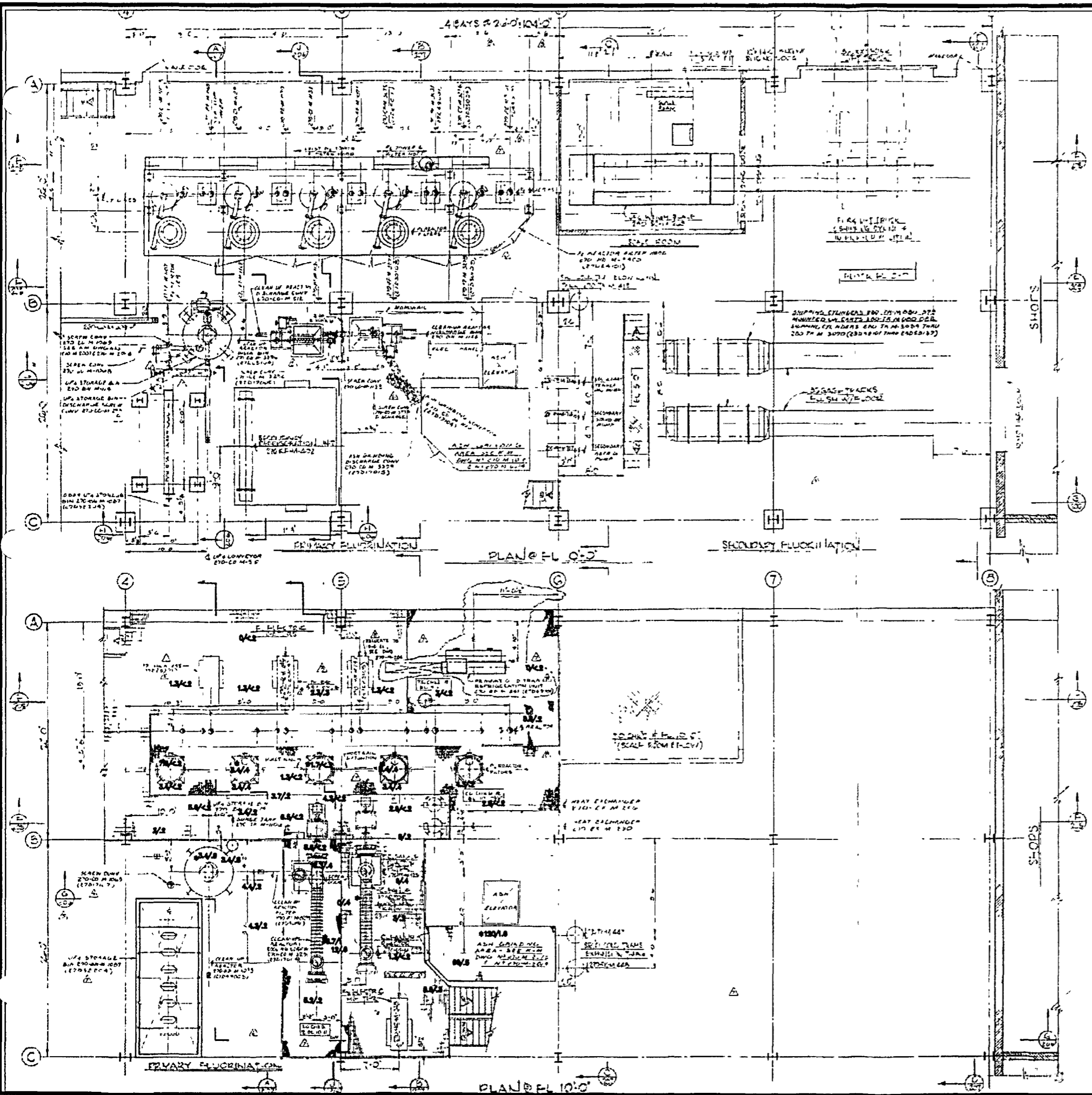
SEQUOYAH FUELS CORPORATION
SITE CHARACTERIZATION REPORT

VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK.
* - DENOTES CONTACT MEASUREMENT.

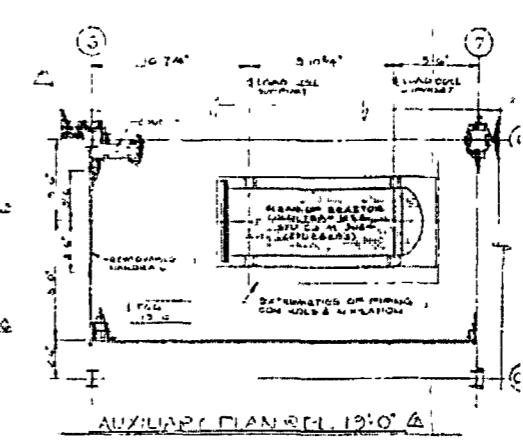
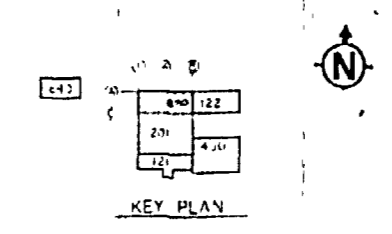
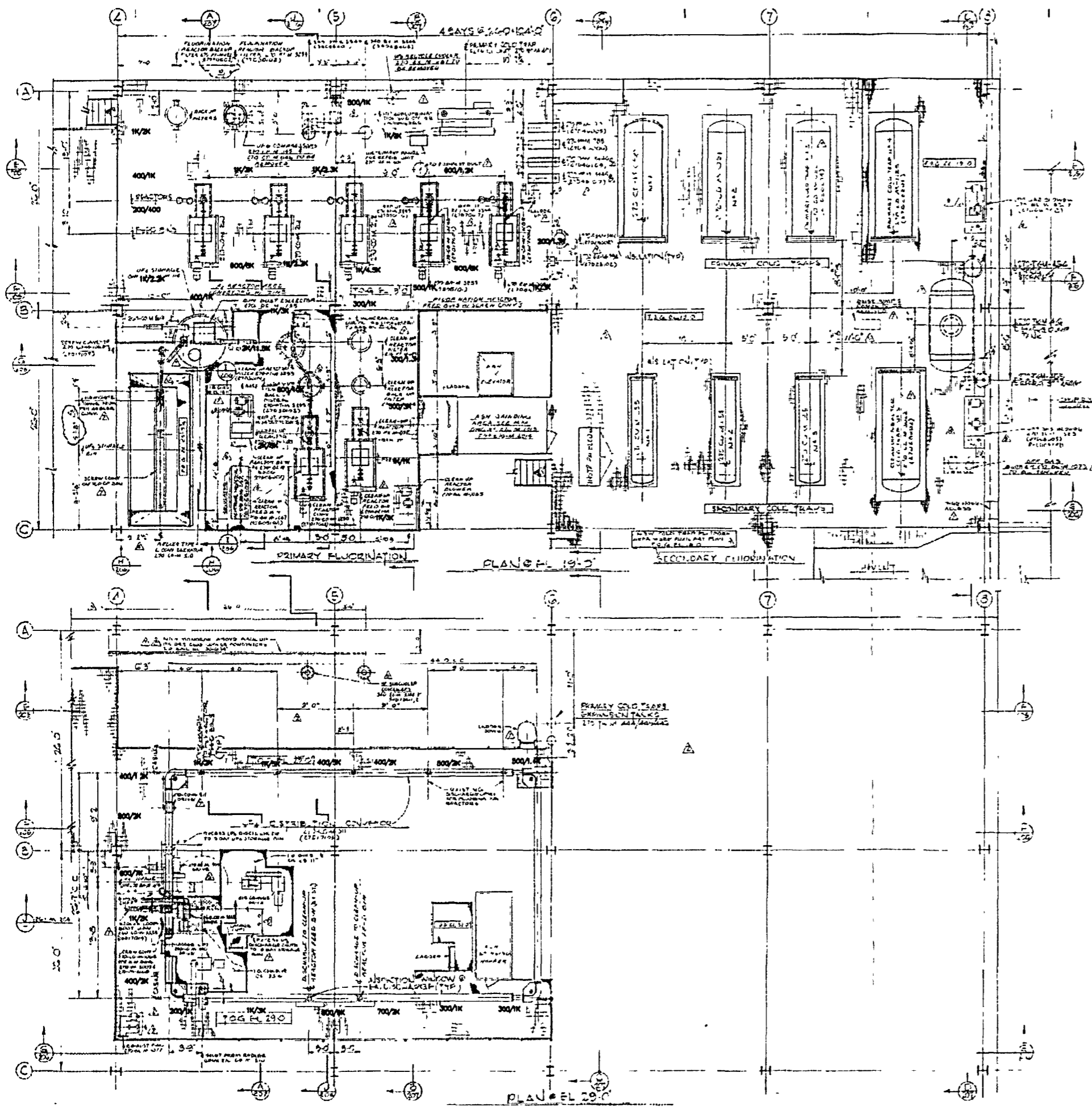
TITLE: GENERAL RADATION LEVELS DENITRATION, REDUCTION & HYDROFLUORINATION	
FILENAME: 260M202	PREPARED BY: SFC
REV. 0	FIGURE NO. 11-12A
DATE: 1/29/96	



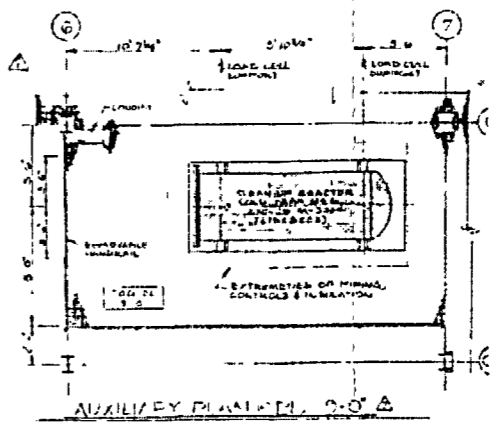
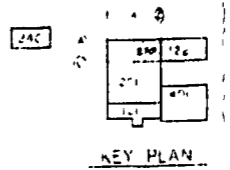
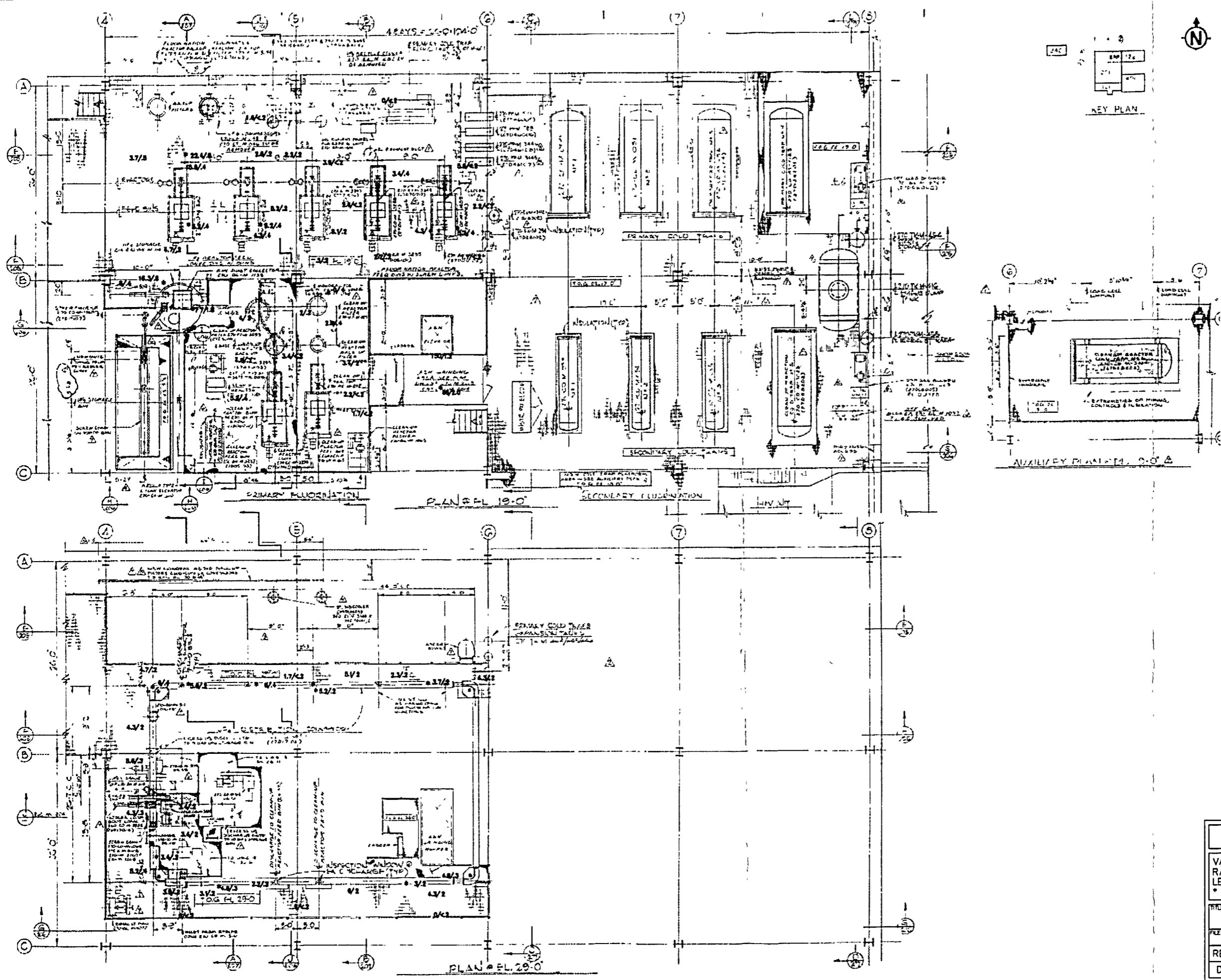
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE: REMOVABLE CONTAMINATION LEVELS 1st & 2nd LEVEL FLUORINATION	
FILENAME: 270M203	PREPARED BY: SFC
REV. 0	FIGURE NO. 11-13
DATE: 1/30/96	



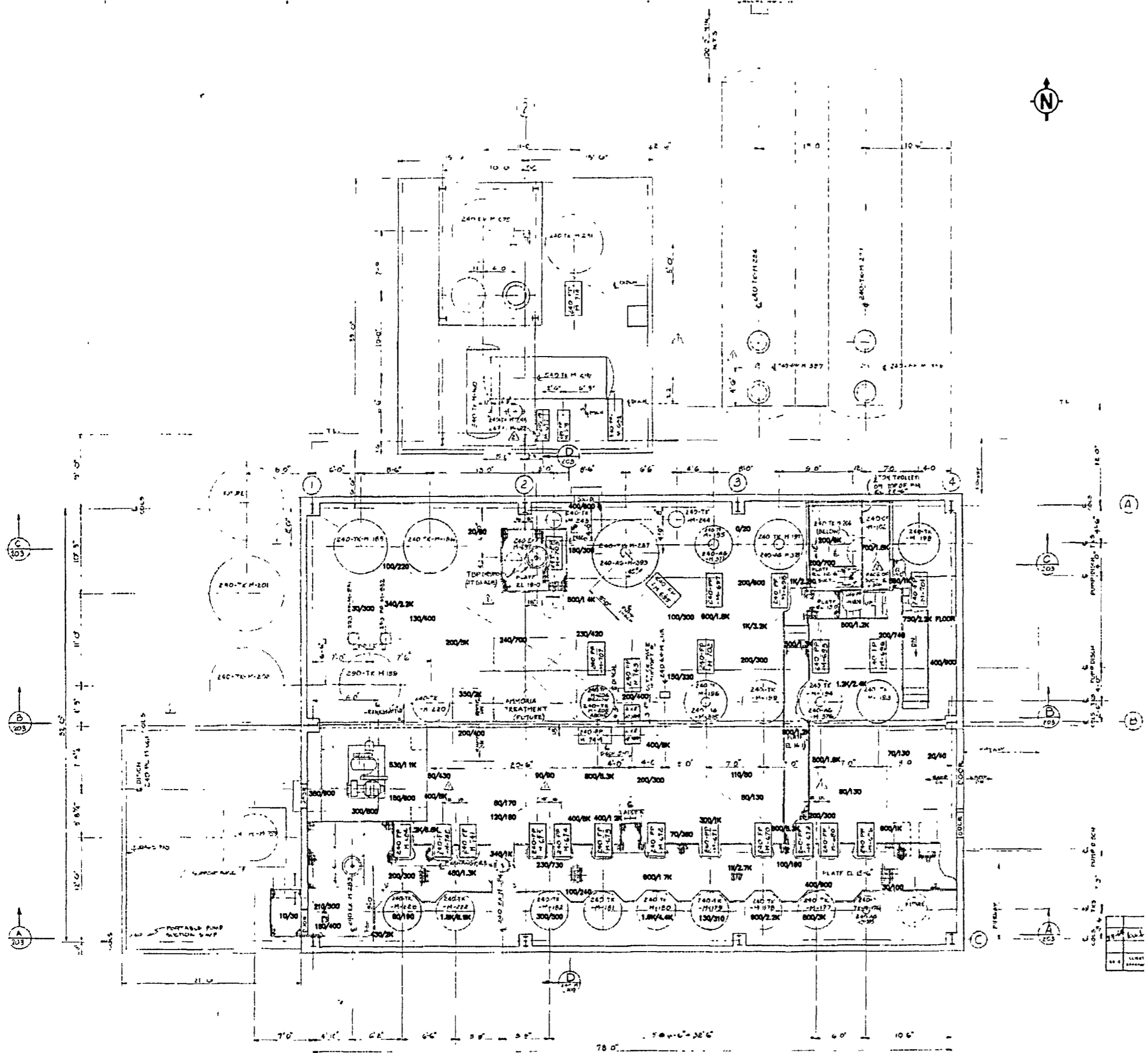
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS 1st & 2nd LEVELS FLUORINATION	
FILENAME 270M203	PREPARED BY SFC
REV. 0	FIGURE NO.11-13A
DATE 1/5/96	



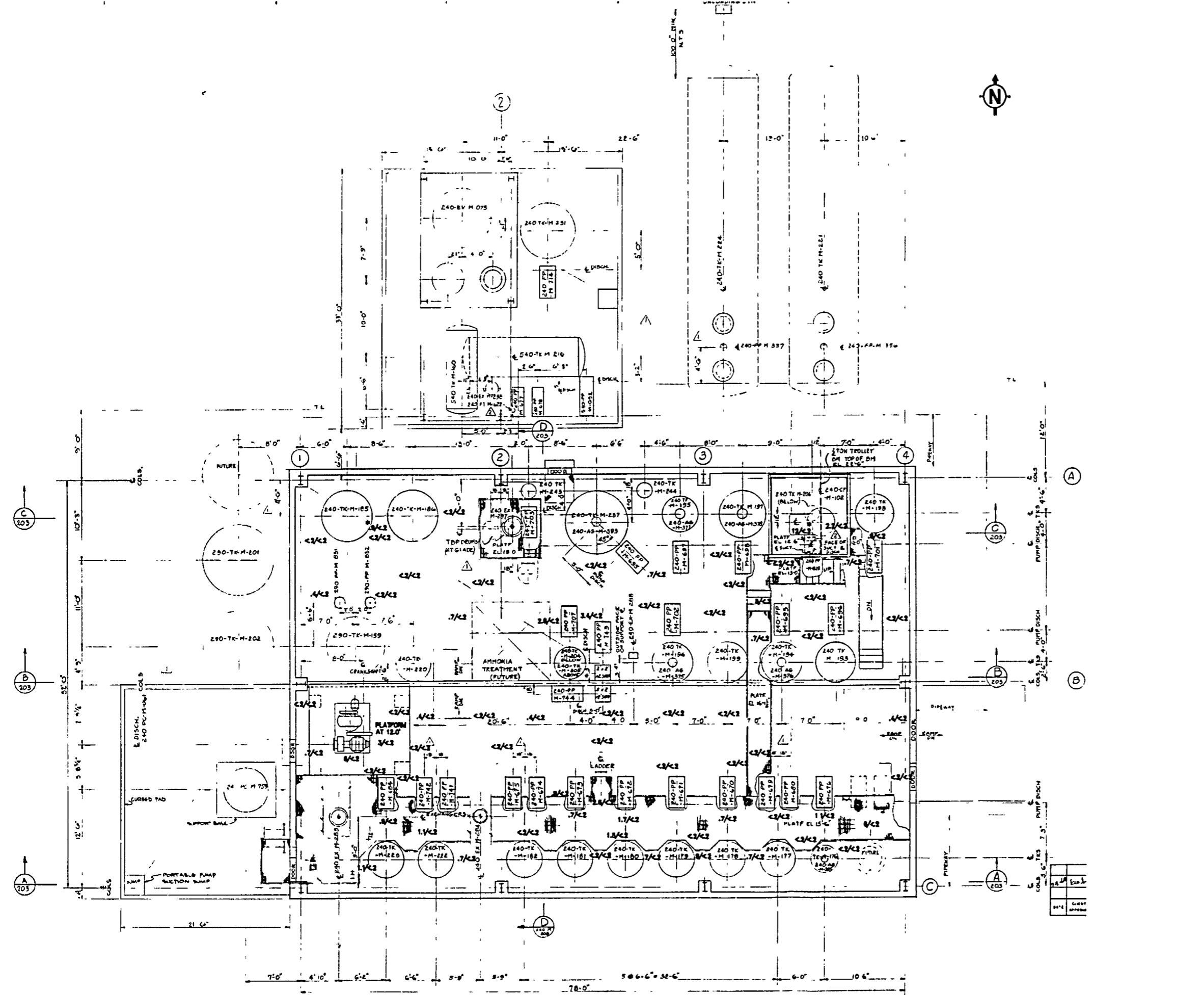
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS 3rd & 4th LEVELS FLUORINATION	
FILENAME 270M204	PREPARED BY SFC
REV 0	FIGURE NO. 11-14
DATE 1/29/96	



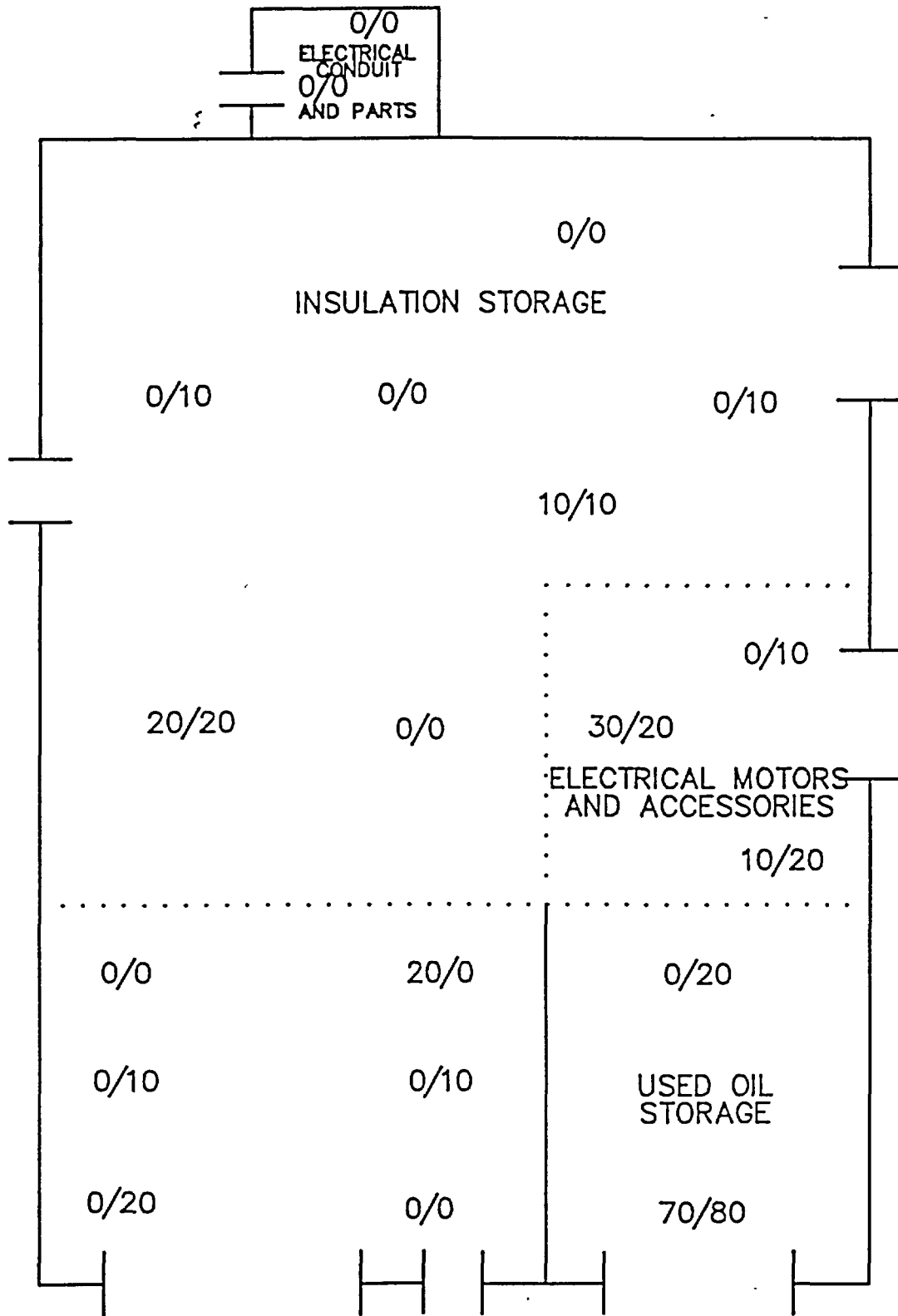
SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK * - DENOTES CONTACT MEASUREMENT.	
TITLE: GENERAL RADIATION LEVELS 3rd & 4th LEVEL FLUORINATION	
FILENAME: 270M204	PREPARED BY: SFC
REV. 0	
DATE: 1/26/96	FIGURE NO. 11-14A



SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE: REMOVABLE CONTAMINATION LEVELS SOLVENT EXTRACTION BUILDING	
FILENAME: 240M202	PREPARED BY: SFC
REV. 0	FIGURE NO. 11-15
DATE: 1/30/96	

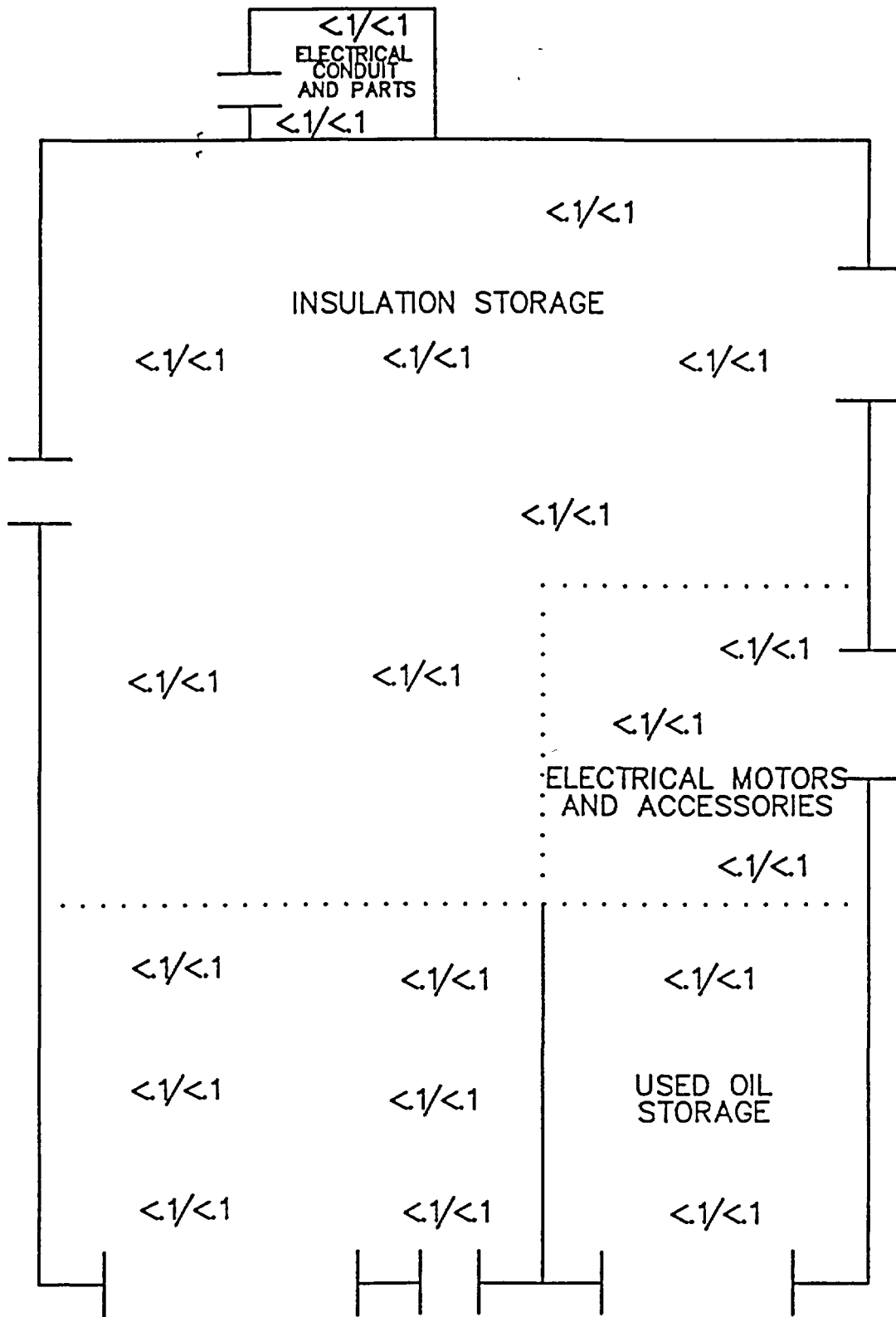


SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE: GENERAL RADIATION LEVELS SOLVENT EXTRACTION BUILDING	
FILENAME: 240M202	PREPARED BY: SFC
REV. 0	FIGURE NO.11-15A
DATE: 1/26/96	

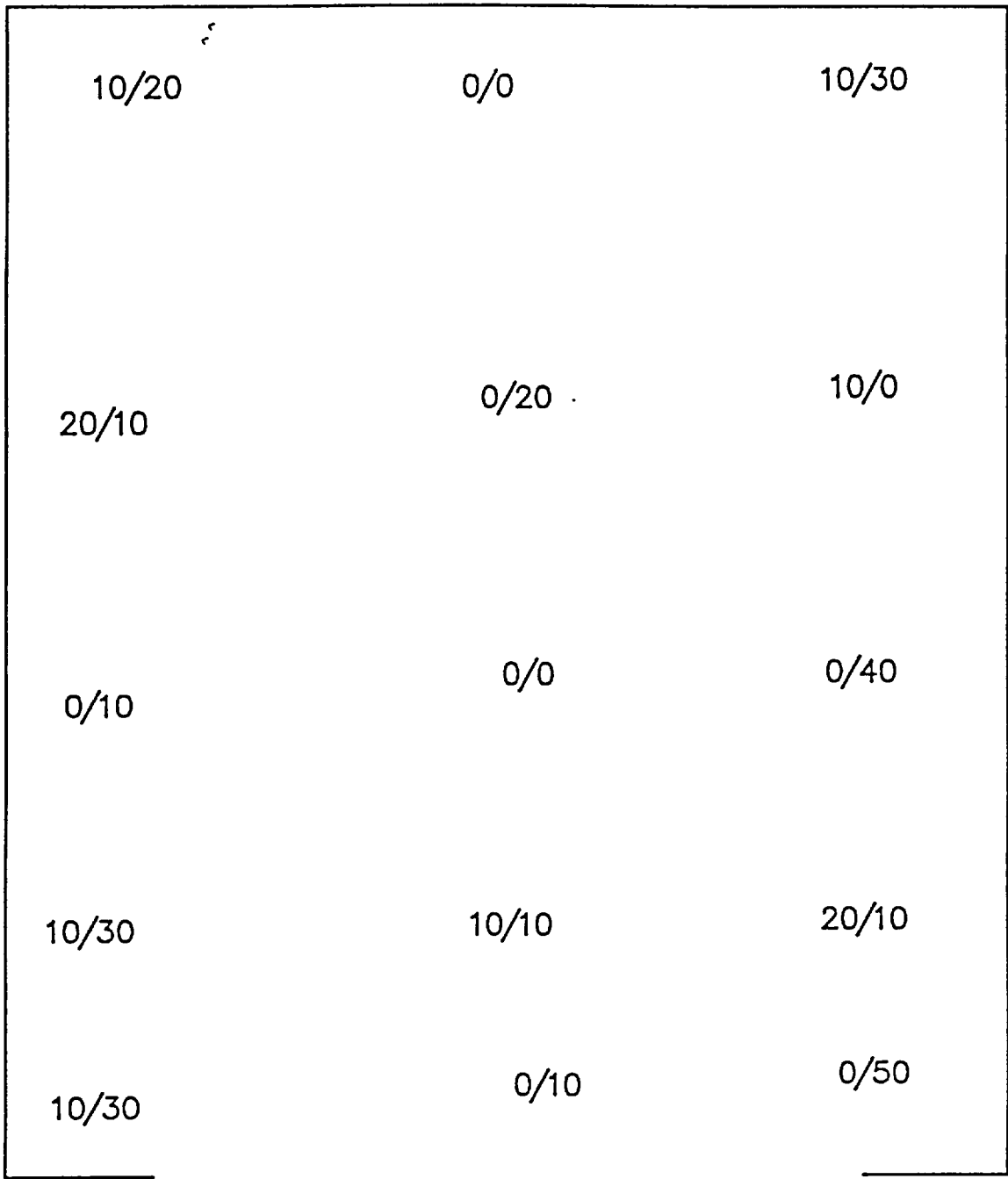


N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS BECHTEL BUILDING	
FILENAME RL-CL-01	PREPARED BY SFC
REV. 0	FIGURE NO. II-16
DATE 1/8/96	

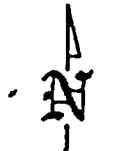
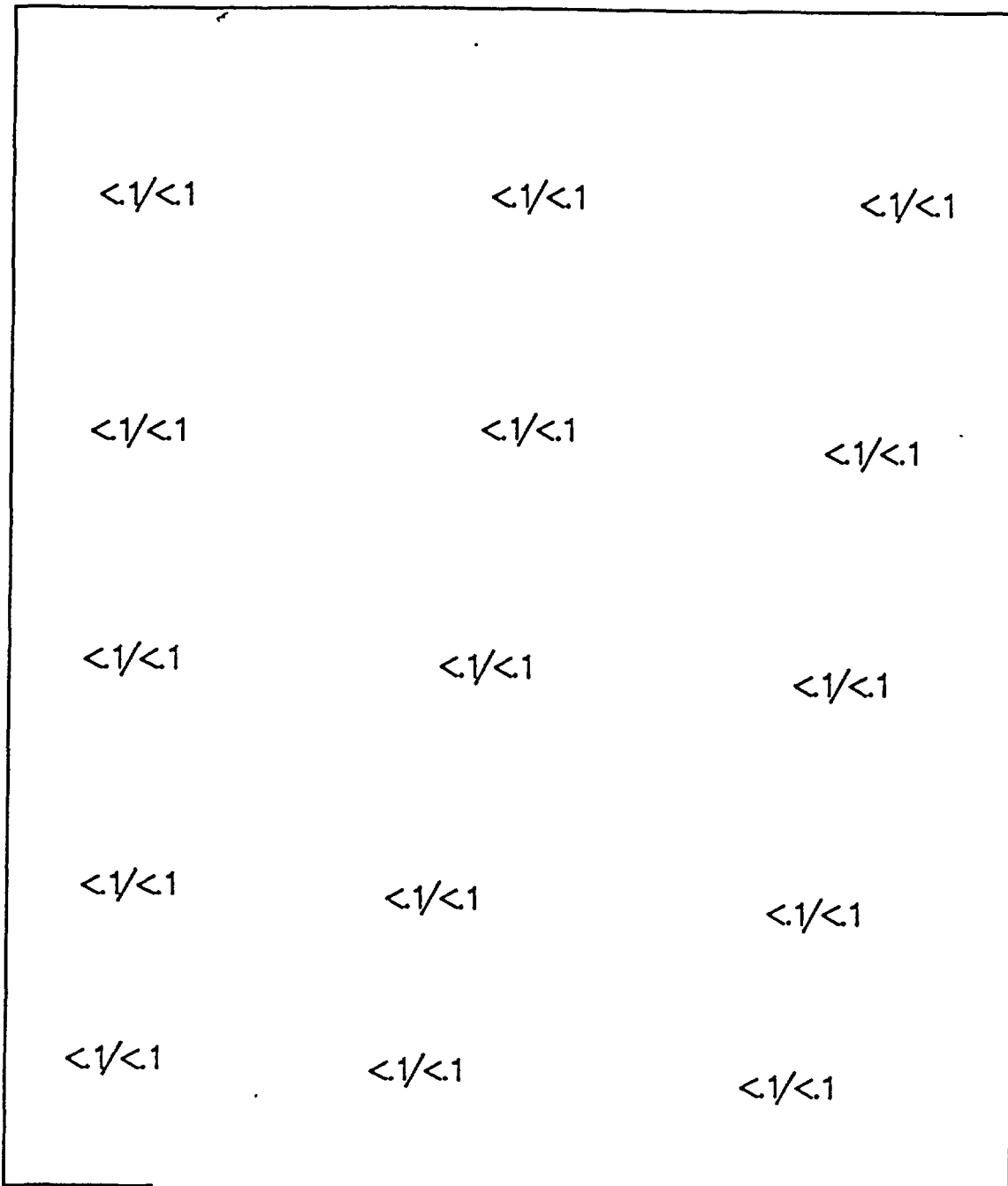


SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS BECHTEL BUILDING	
FILENAME RL-CL-01	PREPARED BY SFC
REV. 0	FIGURE NO. II-16A
DATE 1/29/96	



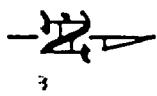
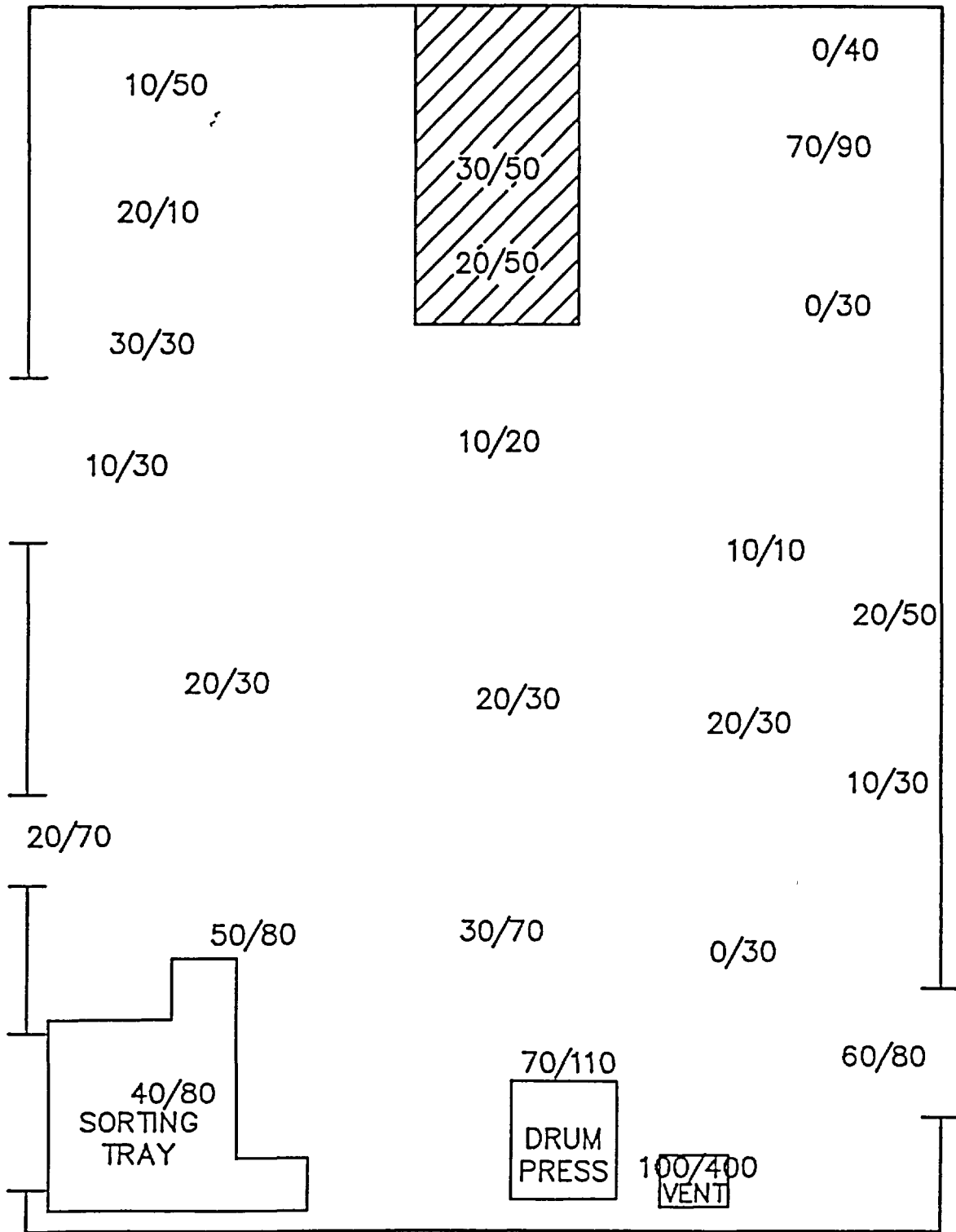
N.T.S.

<i>SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT</i>	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS OIL STORAGE	
FILENAME RL-CL-02	PREPARED BY SFC
REV. 0	FIGURE NO. II-17
DATE 1/8/96	



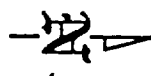
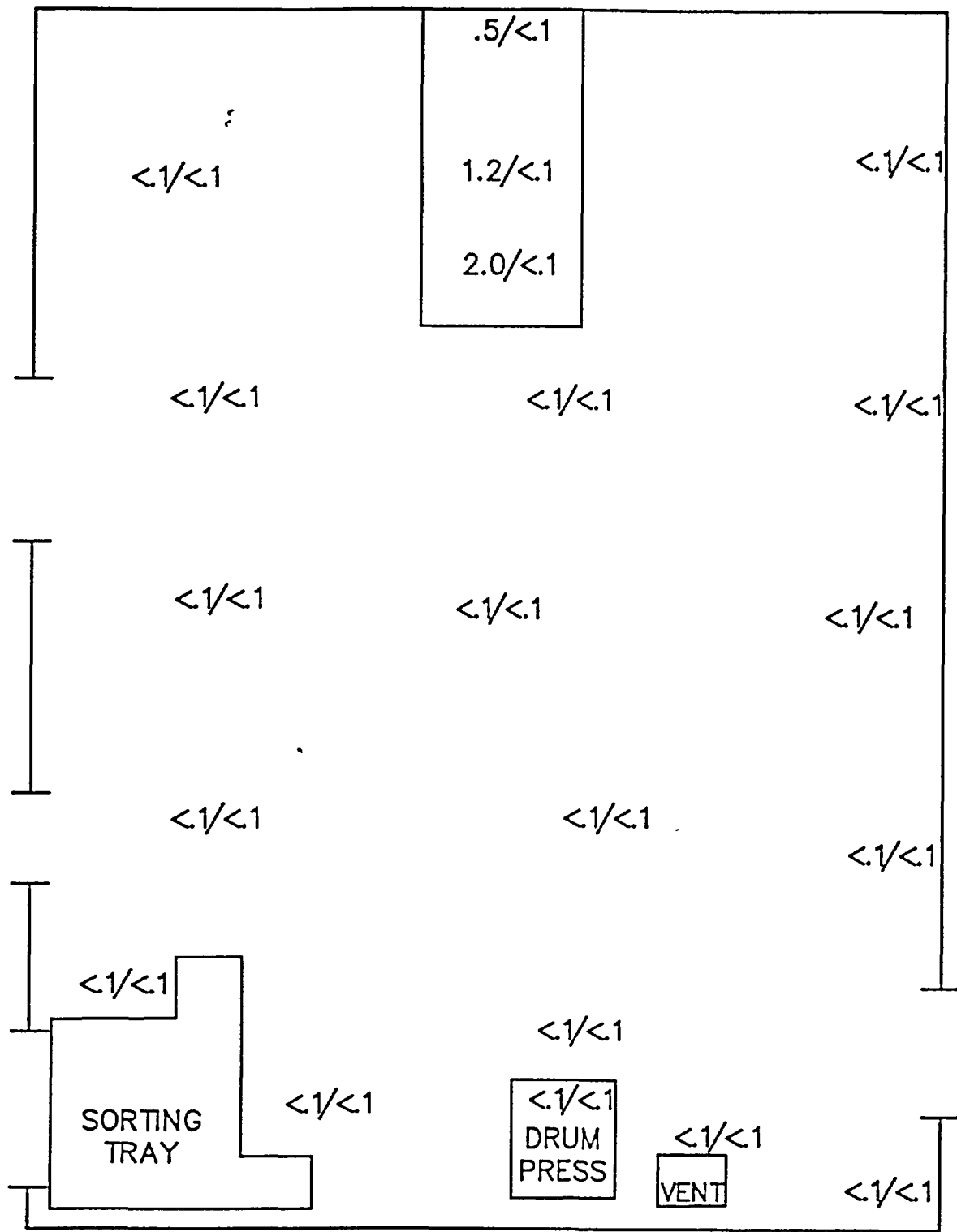
N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS OIL STORAGE	
FILENAME RL-CL-02	PREPARED BY: SFC
REV. 0	FIGURE NO.II-17A
DATE 1/8/96	



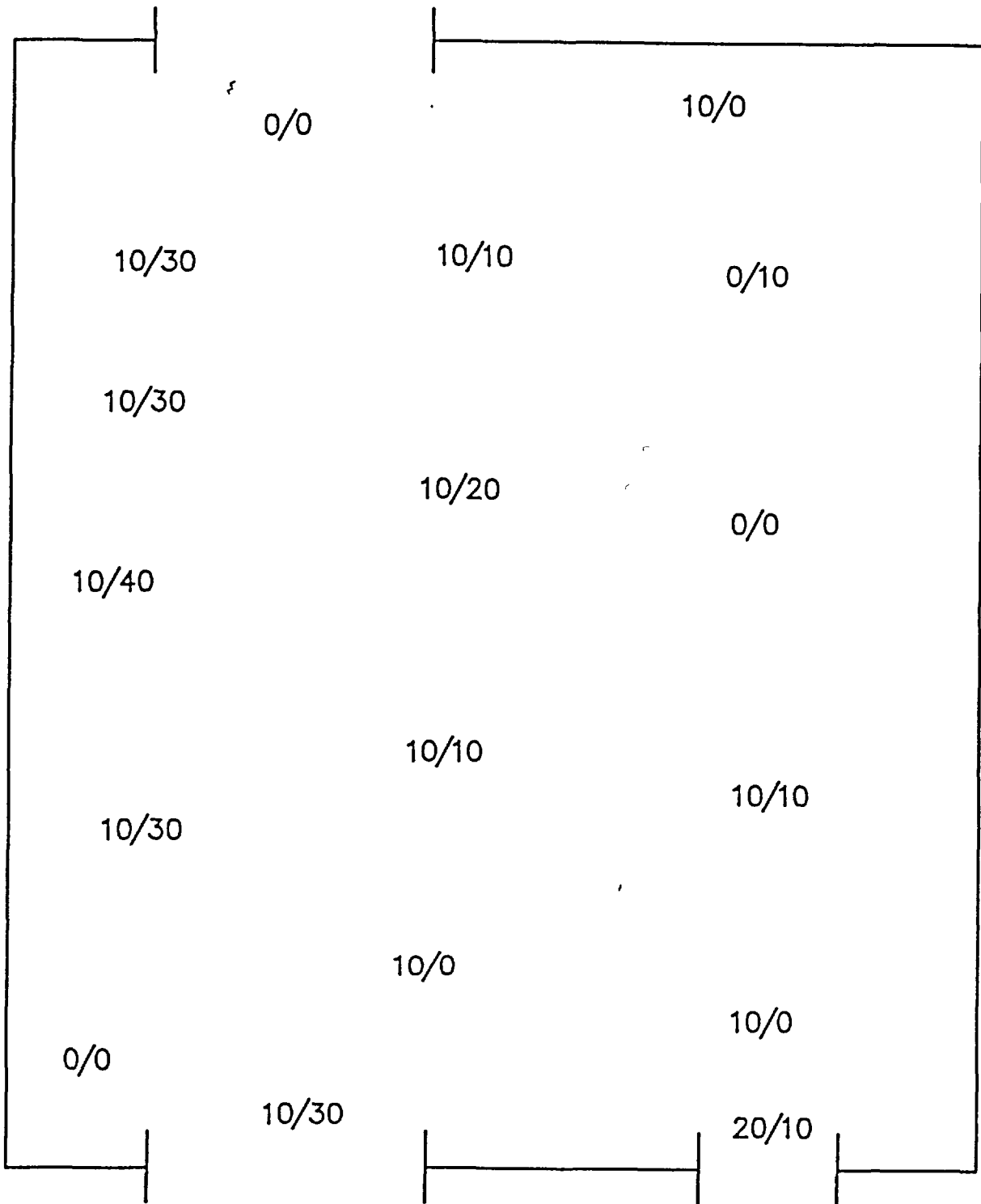
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SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS SOLID WASTE BUILDING	
FILENAME RL-CL-03	PREPARED BY SFC
REV. 0	FIGURE NO. II-18
DATE 1/8/96	



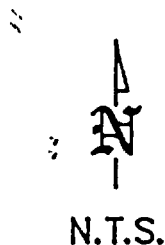
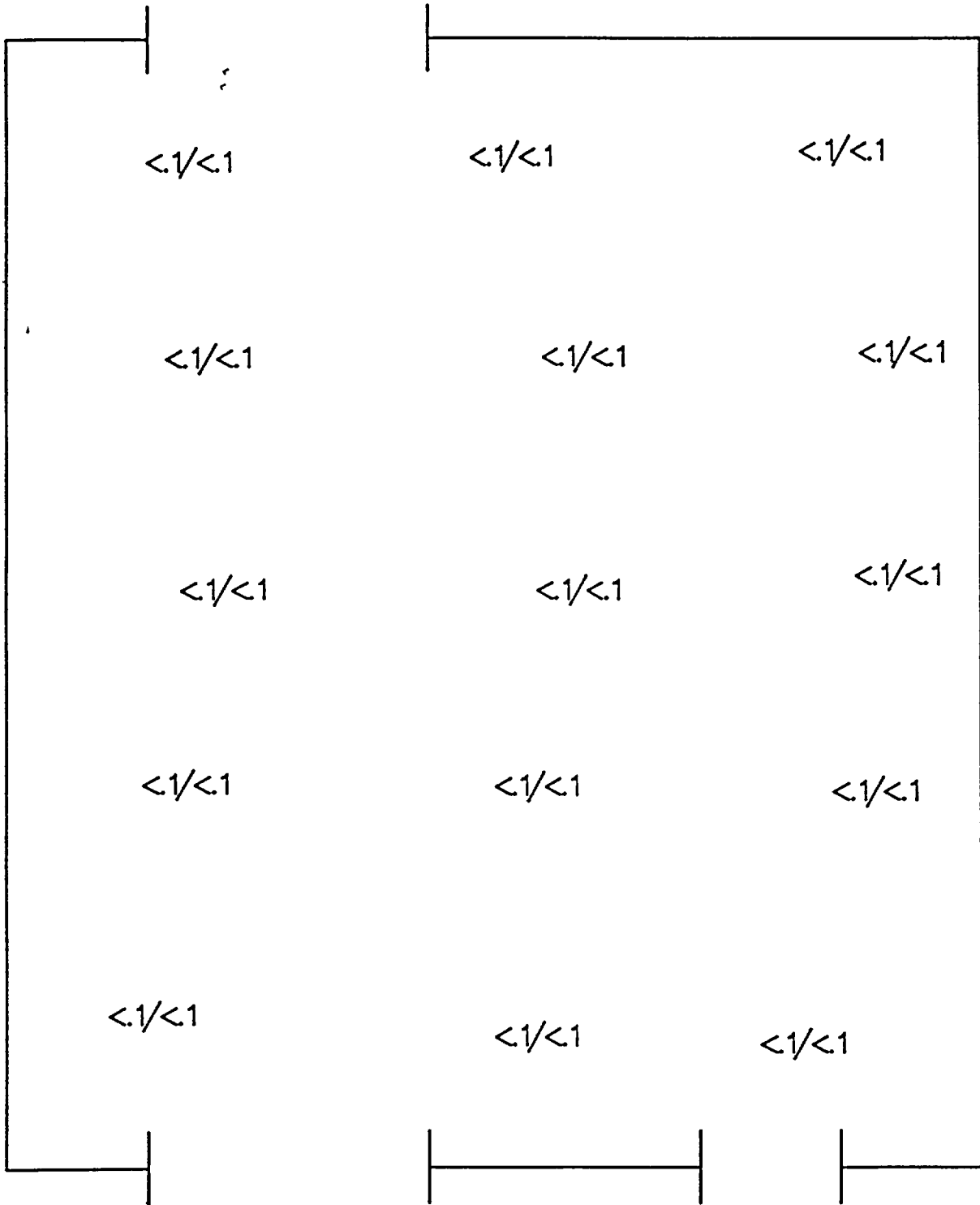
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SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * - DENOTES CONTACT MEASUREMENT.	
TITLE GENERAL RADIATION LEVELS SOLID WASTE BUILDING	
FILENAME RL-CL-03	PREPARED BY SFC
REV. 0	FIGURE NO. II-18A
DATE 1/8/96	



N.T.S.

SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE ALPHA/BETA-GAMMA CONTAMINATION LEVELS IN dpm/100cm ² .	
TITLE REMOVABLE CONTAMINATION LEVELS HOT WAREHOUSE	
FILENAME RL-CL-04	PREPARED BY SFC
REV. 0	FIGURE NO. II-19
DATE 1/8/96	



SEQUOYAH FUELS CORPORATION SITE CHARACTERIZATION REPORT	
VALUES REPORTED ARE BETA-GAMMA/GAMMA DOSE RATES IN mrem/hr AND ARE GENERAL AREA RADIATION LEVELS UNLESS DESIGNATED WITH AN ASTERISK. * -- DENOTES CONTACT MEASUREMENT.	
TITLE: GENERAL RADIATION LEVELS HOT WAREHOUSE	
FILENAME: RL-CL-04	PREPARED BY: SFC
REV. 0	FIGURE NO.II-19A
DATE 1/8/96	

Attachment III

Impacted Material Volume And Activity Estimates

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**IMPACTED MATERIAL VOLUME AND ACTIVITY ESTIMATES
DATA, ASSUMPTIONS AND CALCULATION**

1. DUF₄ Slag, Dust Collector Cleanout and Off-Spec DUF₄

844 55-gallon drums of material
1,170,826 lbs (net wt) as DUF₄ (by representative assay)
889,827 lbs (net wt) as DU
4.04 * 10⁸ g DU
(DU specific activity = 3.6 x 10⁻⁷ Ci/g)

Activity = 145.4 Ci DU

Notes: This material is currently stored in the DUF₄ Building under lock and key. It is assumed that it will be removed from the site by the Department of the Army prior to commencing decommissioning of the building.

2. DUF₄ Drummed Contaminated Trash

299 55-gallon drums of miscellaneous trash materials
Volume = 2200 ft³
DUF₄ content per drum of 10 lbs (Estimation)
 2990 lbs DUF₄
 2270 lbs DU (1032 Kg DU)
 1.03 x 10⁶ g DU
(DU specific activity = 3.6 x 10⁻⁷ Ci/g)

Activity = 0.37 Ci DU

Notes: This material is currently stored in the DUF₄ Building under lock and key. It will ultimately be placed in the on-site disposal cell along with other drummed contaminated trash.

3. Empty Contaminated Drums

Approximately 2250 55-gallon drums
Volume = 16,552 ft³ (uncrushed); ~ 2000 ft³ if crushed
Estimated holdup = 10 g U_{nat}/drum
22,500 g U_{nat}

$$(U_{\text{nat}} \text{ specific activity} = 6.77 \times 10^{-7} \text{ Ci/g})$$

$$\text{Activity} = 0.015 \text{ Ci } U_{\text{nat}}$$

Notes: Drums are currently stored on the South Yellowcake Pad. Deteriorated drums have been crushed and placed in the interim soil cell. Serviceable drums will be retained for use during decommissioning.

4. Scrap Metal

Approximately 100,000 ft³ (uncompacted)
Estimate up to 500 lbs (227 Kg) of U_{nat} contained in scrap
(U_{nat} specific activity = 6.77 x 10⁻⁷ Ci/g)

$$\text{Activity} = 0.15 \text{ Ci } U_{\text{nat}}$$

Notes: Scrap metal currently stored on South Yellowcake Pad. All of this material is either enclosed in boxes or surplus metal tanks or covered with PVC pond cover material to limit spread of contamination. The inventory includes about 2800 ft³ of scrap metal returned from ATG as "undecontaminable".

5. Raffinate Sludge (Unit 17)

Volume: 8.3 million gallons @ an estimated 20% solids based on sludge level measurements in the 1A, 2A and 3A Clarifiers. Sludge levels are 10.39 ft, 10.61 ft, and 10.70 ft in 1A, 2A, and 4A, respectively. This volume equates to 1.11 x 10⁶ ft³.

Weight: (8.3 x 10⁶ gal) * (8.34 lbs/gal) * (0.2 wt% solids) = 13.8 x 10⁶ lbs of solids or 6.28 x 10⁹ g

Radionuclide Content: In 1993, about 80% of the raffinate sludge was stored in Pond 4 with about 15% in Clarifier 4A and the remainder in 1A and 2A. Weighted averages of 1993 sample analyses from Pond 4 and Clarifier 4A for uranium, radium 226 and thorium 230 were as follows. By early 1995, all of the raffinate sludge had been moved from impoundment to impoundment to allow relining of the clarifiers and emptying of Pond 4 and was stored in clarifiers 1A, 2A and 4A. An average value for each constituent was assumed in the calculation.

Uranium - 8735.8 µgU/g
Radium 226 - 118.1 pCi/g
Thorium 230 - 9611.1 pCi/g

$$\text{Uranium} = (6.28 \times 10^9 \text{ g}) * 8735.8 \text{ µgU/g}$$

$$\begin{aligned}
&= 5.486E^{13} \text{ } \mu\text{gU or} \\
&= 54,861 \text{ kgU or} \\
&= 37.1 \text{ Ci U}_{\text{nat}}
\end{aligned}$$

$$\begin{aligned}
\text{Radium 226} &= (6.28 \times 10^9 \text{ g}) * 118.4 \text{ pCi/g} \\
&= 7.44 \times 10^{11} \text{ pCi Ra 226 or} \\
&= 0.7 \text{ Ci Ra 226}
\end{aligned}$$

$$\begin{aligned}
\text{Thorium 230} &= (6.28 \times 10^9 \text{ g}) * 9611.1 \text{ pCi/g} \\
&= 6.041 \times 10^{13} \text{ pCi Th 230 or} \\
&= 60.4 \text{ Ci Th 230}
\end{aligned}$$

Nitrate Content: The nitrate in the raffinate sludge was an average of 22,525 $\mu\text{g/g}$.

$$\begin{aligned}
\text{Nitrate} &= (6.28 \times 10^9 \text{ g}) * 22,525 \text{ } \mu\text{g/g} \\
&= 1.42E^{14} \text{ } \mu\text{g nitrate or} \\
&= 141,457 \text{ kg nitrate}
\end{aligned}$$

Fluoride Content: The fluoride in the raffinate sludge was an average of 26,200 $\mu\text{g/g}$.

$$\begin{aligned}
\text{Fluoride} &= (6.28 \times 10^9 \text{ g}) * 26,200 \text{ } \mu\text{g/g} \\
&= 1.65E^{14} \text{ } \mu\text{g fluoride or} \\
&= 164,536 \text{ kg fluoride}
\end{aligned}$$

6. Packaged Contaminated Trash

As of 1/17/96, there were 551 55-gallon drums of packaged contaminated trash stored in the F₂ cell rooms under lock and key. 54 of these drums contain contaminated asbestos and 21 contain trash from the DUF₄ plant. The remainder are from the UF₆ production operation.

$$\text{Volume: } 551 \text{ drums} * 7.35 \text{ ft}^3/\text{drum} = 4050 \text{ ft}^3$$

Activity Estimate: From review of shipping records and composite samples from selected drums, the uranium content ranges typically from 20 to 60 g/drum.

$$\text{Uranium} = 551 \text{ drums} * 40\text{gU/drum} = 22040 \text{ gU or } 0.015 \text{ Ci U}_{\text{nat}}$$

7. Calcium Fluoride Sludge

Volume Estimates:

Fluoride Settling Basin #1	=	29,300 ft ³ (1)
Fluoride Settling Basin #2	=	40,000 ft ³ (1)
Fluoride Clarifier (Basin #3)	=	20,000 ft ³ (1)
1991-1992 CaF ₂ Production	=	25,000 ft ³ (2)
Fluoride Holding Basin #1	=	171,400 ft ³ (1)
Fluoride Holding Basin #2	=	186,000 ft ³ (1)
Buried Calcium Fluoride	=	<u>153,580 ft³</u> (3)
Total	=	625,280 ft³

(1) Based on an engineering estimate performed in October, 1990.

(2) Calculated based on quantity of UF₆ produced in 1991/92

(3) Based on burial records from SFC Decommissioning File, and validated by drawings showing cell dimensions. Includes 96,380 ft³ that was buried and 57,200 ft³ of CaF₂ in west end of Trench 2 that was not covered by soil. The uncovered area has been referred to as Basin #4.

CaF₂ Characteristics:

ETAS ⁽⁴⁾	85.0 lb/ft ³	51.0% Solids
OHM ⁽⁴⁾	<u>70.0 lb/ft³</u>	<u>36.0% Solids</u>
avg.	77.5 lb/ft ³	43.5% Solids

(4) Independent characterization dewatering and stabilization studies were performed by ETAS and OHM Corporation's in 1993 and 1994. Different samples were utilized for each study.

Unit 14

Fluoride Settling Basin #1	29,300 ft ³
Fluoride Settling Basin #2	40,000 ft ³
Fluoride Clarifier	20,000 ft ³
1992/1992 Production	<u>25,000 ft³</u>
Total Volume CaF₂ - Unit 14	114,300 ft³

$$114,300 \text{ ft}^3 * 77.5 \text{ lb/ft}^3 * 0.435 \text{ (solids fraction)} = 3.85 \times 10^6 \text{ lb CaF}_2 \text{ (dry)}$$

$$= 1.75 \times 10^9 \text{ g CaF}_2 \text{ (dry)}$$

U content, 780 $\mu\text{gU/g}$

$$1.75 \times 10^9 \text{ g} * 780 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 1365 \text{ kgU}$$

$$1365 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 0.92 \text{ Ci U}_{\text{nat}}$$

Ra 226 content (from Unit 14), 0.8 pCi/g

$$1.75 \times 10^9 \text{ g} * 0.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.001 \text{ Ci Ra 226}$$

Th 230 content (from Unit 14), 4.8 pCi/g

$$1.75 \times 10^9 \text{ g} * 4.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.008 \text{ Ci Th 230}$$

Unit 13

Fluoride Holding Basin #1 171,400 ft^3

$$171,400 \text{ ft}^3 * 77.5 \text{ lb/ft}^3 * 0.435 \text{ (solids fraction)} = 5.78 \times 10^6 \text{ lb CaF}_2 \text{ (dry)}$$

$$= 2.62 \times 10^9 \text{ g CaF}_2 \text{ (dry)}$$

U content, 467 $\mu\text{gU/g}$

$$2.62 \times 10^9 \text{ g} * 467 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 1223.5 \text{ kgU}$$

$$1223.5 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 0.82 \text{ Ci U}_{\text{nat}}$$

Ra 226 content (from Unit 14), 0.8 pCi/g

$$2.62 \times 10^9 \text{ g} * 0.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.002 \text{ Ci Ra 226}$$

Th 230 content (from Unit 14), 4.8 pCi/g

$$2.62 \times 10^9 \text{ g} * 4.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.013 \text{ Ci Th 230}$$

Unit 12

Fluoride Holding Basin #2 186,000 ft^3

$$186,000 \text{ ft}^3 * 77.5 \text{ lb/ft}^3 * 0.435 \text{ (solids fraction)} = 6.27 \times 10^6 \text{ lb CaF}_2 \text{ (dry)}$$

$$= 2.85 \times 10^9 \text{ g CaF}_2 \text{ (dry)}$$

U content, 534 $\mu\text{gU/g}$

$$2.85 \times 10^9 \text{ g} * 534 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 1522 \text{ kgU}$$

$$1522 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 1.02 \text{ Ci U}_{\text{nat}}$$

Ra 226 content, 0.8 pCi/g

$$2.85 \times 10^9 \text{ g} * 0.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.002 \text{ Ci Ra 226}$$

Th 230 content, 4.8 pCi/g

$$2.85 \times 10^9 \text{ g} * 4.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.014 \text{ Ci Th 230}$$

Unit 15

Buried CaF ₂	96,380 ft ³
From burial records, uranium	= 1.52 Ci U _{nat}
1.52 Ci U _{nat} + 6.7 x 10 ⁻⁴ Ci/kg U _{nat}	= 2268 kgU

Fluoride Holding Basin #1	57,200 ft ³
---------------------------	------------------------

$$57,200 \text{ ft}^3 * 77.5 \text{ lb/ft}^3 * 0.435 \text{ (solids fraction)} = 1.93 \times 10^6 \text{ lb CaF}_2 \text{ (dry)}$$

$$= 0.875 \times 10^9 \text{ g CaF}_2 \text{ (dry)}$$

U content, 462 $\mu\text{gU/g}$

$$0.875 \times 10^9 \text{ g} * 462 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 404 \text{ kgU}$$

$$404 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 0.27 \text{ Ci U}_{\text{nat}}$$

Ra 226 content = 0.8

$$0.875 \times 10^9 \text{ g} * 0.8 \mu\text{gU/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.001 \text{ Ci Ra 226}$$

Th 230 content, 4.8 pCi/g

$$0.875 \times 10^9 \text{ g} * 4.8 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.004 \text{ Ci Th 230}$$

CaF₂ Totals Volume = 625,280 ft³

U = 6,782 kg or 4.55 Ci U_{nat}

Ra 226 = 0.006 Ci

Th 230 = 0.039 Ci

8. Contaminated Soils Under Clarifiers and Ponds

Fertilizer Ponds

Pond 3E Clay Liner

Assume:

- Ponds 3W, 5, and 6 unaffected, therefore no clay liner removal required

- removal of 0.5 feet of clay from bottom and sides of Pond 3E

Pond 3E dimensions:

Top: 400 by 400 feet, 18 feet deep, 3 to 1 side slopes, Bottom 292 by 292 feet, sidewall 57 feet.

$$\text{Volume} = (292 * 292 * 0.5) + ((400 * 57 * 0.5) * 4) = 88,232 \text{ ft}^3$$

Activity: Uranium, 7.4 µgU/g (Pond 4)

$$88,232 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 10 \text{ µgU/g} * 1 \times 10^{-9} \text{ kg/µg} = 32.6 \text{ kgU}$$

$$32.6 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 0.02 \text{ Ci U}_{\text{nat}}$$

Ra 226 and Th 230 at background

Clarifiers 1A, 2A, 3A, and 4A

Assume removal of 2.0 feet of clay from bottom and 1.0 feet of clay from sides of each clarifier

Clarifier dimensions: Top = 200 by 250 feet, 13 feet deep, 2.2 to 1 side slopes, Bottom 142 by 192 feet, sidewall 31.75 feet.

$$\begin{aligned} \text{Volume} &= (142 * 192 * 2.0) + (900 * 31.75 * 1.0) \\ &= 83,100 \text{ ft}^3 \text{ (per clarifier)} * 4 \text{ clarifiers} \end{aligned}$$

$$= 332,400 \text{ ft}^3$$

Activity:

Uranium, 42 $\mu\text{gU/g}$ - based on weighted average of samples taken from bottom of 3A clarifier in 1993. Assumed that 3A would be representative of all clarifiers.

$$332,400 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 42 \text{ } \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/} \mu\text{g} = \\ = 697 \text{ kgU}$$

$$697 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 0.47 \text{ Ci U}_{\text{nat}}$$

$$\text{Ra 226} = 0.5 \text{ pCi/g (wgtd avg of HA-198)}$$

$$332,400 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 0.5 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = \\ = 0.0083 \text{ Ci Ra 226}$$

$$\text{Th 230, 70 pCi/g (wgtd avg of HA-198)}$$

$$332,400 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 70 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = \\ = 1.16 \text{ Ci Th 230}$$

Pond 2 Residual Materials

Assume removal of clay/sludge from bottom down to the depth of each sample plus 1.0 ft from the sidewalls. Samples were taken at the center of each of 21-100 by 100 ft grids on the pond bottom (HA 199 through HA-219 taken in 1991, just prior to covering the pond).

Pond dimensions: Top = 300 by 700 feet, 18 feet deep, 3 to 1 side slopes, Bottom 192 by 592 feet, sidewall 57 feet.

$$\begin{array}{lcl} \text{Volume bottom} & = & 635,000 \text{ ft}^3 \\ \text{Volume sidewalls} & = & 114,000 \text{ ft}^3 \\ \text{Total volume} & = & 749,000 \text{ ft}^3 \end{array}$$

Activity: Weighted averages of the concentrations of radionuclides in samples taken from various depths in each grid was calculated and applied to the volume of material contained in each grid. The quantities for each grid were then summed.

Example calculation - Hole 1 total depth 3.5 ft or 7-0.5 ft intervals

$$U_{\text{avg.}} = \frac{16.4 + 13.5 + [(13.5 + 6.7) \div 2 * 4] + 6.7}{7} =$$

$$= 11 \mu\text{gU/g}$$

$$100 \text{ ft} * 100 \text{ ft} * 3.5 \text{ ft} * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 11 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} =$$

$$= 19.2 \text{ kgU} * 6.7 \times 10^{-4} \text{ pCi/ kgU} =$$

$$= 0.013 \text{ Ci } U_{\text{nat}}$$

Total Activity:

$$\text{Uranium} = 16,074 \text{ kgU or } 10.77 \text{ Ci } U_{\text{nat}}$$

$$\text{Ra 226} = 1.61 \text{ Ci}$$

$$\text{Th 230} = 48.03 \text{ Ci}$$

Pond 1 Spoils Pile

Volume = 437,400 ft³ (per FEI evaluation)

Activity:

Uranium, 7.2 μgU/g (based on average of samples taken from pile in 1995, BH-131A and BH-131B.

$$437,400 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 7.2 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 157 \text{ kgU}$$

$$157 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{\text{nat}} = 0.11 \text{ Ci } U_{\text{nat}}$$

Ra 226, 2.1 pCi/g (avg of 8 samples taken in 1987 - HA-335 through 342)

$$437,400 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 2.1 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} =$$

$$= 0.046 \text{ Ci Ra 226}$$

Th 230, 47 pCi/g (avg of 8 samples taken in 1987 - HA-335 through 342)

$$437,400 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 47 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} =$$

$$= 1.02 \text{ Ci Th 230}$$

CaF₂ Basin Clay Liner

Assume that 0.5 ft of soil/clay will be removed from the pit walls and bottoms after CaF₂ is removed.

Basin Dimensions/Soil Volume to Remove

Fluoride Settling Basins #1 and #2

Dimensions: 190 by 75 by 14 ft

Removal Volume:

$$[190 * 75 + (190 + 190 + 75 + 75) * 14] * 0.5 * 2 \text{ Units} = 21,670 \text{ ft}^3$$

Fluoride Clarifier

Dimensions: 220 by 85 by 14 ft

Removal Volume:

$$[220 * 85 + (220 + 220 + 85 + 85) * 14] * 0.5 = 13,620 \text{ ft}^3$$

Fluoride Holding Basin #1

Dimensions: 190 by 130 by 16 ft

Removal Volume:

$$[190 * 130 + (190 + 190 + 130 + 130) * 16] * 0.5 = 17,470 \text{ ft}^3$$

Fluoride Holding Basin #2

Dimensions: 150 by 200 by 9 ft

Removal Volume:

$$[150 * 200 + (150 + 150 + 200 + 200) * 9] * 0.5 = 18,150 \text{ ft}^3$$

East/West Burial Pits

Dimensions: 100 by 200 by 12

Removal Volume:

$$[100 * 200 + (100 + 100 + 200 + 200) * 12] * 0.5 = 13,600 \text{ ft}^3$$

Burial Pit #3 and #4 (combined dimen.)

Dimensions: 50 by 275 by 12

Removal Volume:

$$[50 * 275 + (50 + 50 + 275 + 275) * 12] * 0.5 = 10,775 \text{ ft}^3$$

Total Removal Volume:= 95,285 ft³

Activity:

Uranium = Assume 20 µgU/g avg. (conservative estimate based on expected low solubility of uranium in CaF₂), no Th or Ra

$$95,285 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 20 \text{ µgU/g} * 1 \times 10^{-9} \text{ kg/µg} = 95.2 \text{ kgU}$$

$$95.2 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{\text{nat}} = 0.064 \text{ Ci } U_{\text{nat}}$$

9. Interim Storage Cell

Dimensions: 100 ft by 160 ft, ht 7.5 to 15 ft

Volume: 86 incident soil= 12,150 ft³
Lime Neut. Area Decon= 65,880 ft³
SX Excav. Soil= 44,550 ft³
Pond 4= 13,932 ft³
Subtotal= 136,512 ft³

~2500 55-gal drums Misc. soil and Incin. Ash @ 7.35 ft³/drum= 18,375 ft³
Total volume = 154,887 ft³

Activity: (from Preliminary Report on Current Condition, Feb. 23, 1994)

1986 Accident Soil - U_{avg} , 223 $\mu\text{gU/g}$

$12,000 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 223 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/g} = 133 \text{ kgU}$
 $133 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{nat} = 0.09 \text{ Ci } U_{nat}$

Lime Neut. Area Soil - U_{avg} , 20 $\mu\text{gU/g}$

$65,880 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 20 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/g} = 65.7 \text{ kgU}$
 $65.7 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{nat} = 0.04 \text{ Ci } U_{nat}$

SX Excavation Soil - U_{avg} , 1800 $\mu\text{gU/g}$

$44,550 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 1800 \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/g} = 4000 \text{ kgU}$
 $4000 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{nat} = 2.68 \text{ Ci } U_{nat}$

SX Excavation Soil - Th 230 = 2.9 pCi/g

$44,550 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 2.9 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi}$
 $= 0.006 \text{ Ci Th 230}$

SX Excavation Soil - Ra 226 = 0.3 pCi/g

$44,550 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 0.3 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi}$
 $= 0.0006 \text{ Ci Ra 226}$

Pond 4 Liner - U_{avg} , 7.4 $\mu\text{gU/g}$

$$13,932 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 7.4 \text{ } \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/}\mu\text{g} = \\ = 5.1 \text{ kgU}$$

$$5.1 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{nat} = 0.003 \text{ Ci } U_{nat}$$

$$13,932 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 1.4 \text{ pCi Ra/g} * 1 \times 10^{-12} \text{ Ci/pCi} = \\ = 0.001 \text{ Ci Ra 226}$$

$$13,932 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 13.9 \text{ pCi Th/g} * 1 \times 10^{-12} \text{ Ci/pCi} = \\ = 0.01 \text{ Ci Th 230}$$

Ash and Soil Drums - Assume 2500 drums at 700 lb/drum and 150 $\mu\text{gU/g}$
(Estimated number and content)

$$2500 * 700 \text{ lb} * 454 \text{ g/lb} * 150 \text{ } \mu\text{gU/g} = 119 \text{ kgU}$$

$$119 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{nat} = 0.08 \text{ Ci } U_{nat}$$

10. Sanitary Lagoon

Dimensions: 230 ft by 150 ft by 8 ft; 3 to 1 sides

$$\text{Bottom: } (230 - 48) * (150 - 48) = 18,564 \text{ ft}^2$$

$$\text{Sides: } [(2 * 230) + (2 * 150)] * 25.2 = 19,228 \text{ ft}^2$$

Sediment Estimate

$$\text{Volume: } 6.7 \text{ inch depth} * 18,564 \text{ ft}^2 = 10,365 \text{ ft}^3$$

Activity: Est. 70 lb/ft^3 , 30% solids: 19,317 $\mu\text{gU/g}$, 275.5 pCi Th 230/g, 5.8 pCi Ra 226/g (analyses are avg U of source data, estimated Ra 226 and Th 230)

$$10,365 \text{ ft}^3 * 70 \text{ lb/ft}^3 * 0.3 * 454 \text{ g/lb} * 19,317 \text{ } \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/}\mu\text{g} = \\ = 1909 \text{ kgU}$$

$$1909 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{nat} = 1.28 \text{ Ci } U_{nat}$$

$$10,365 \text{ ft}^3 * 70 \text{ lb/ft}^3 * 0.3 * 454 \text{ g/lb} * 5120 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} =$$

$$= 0.5 \text{ Ci Th 230}$$

$$10,365 \text{ ft}^3 * 70 \text{ lb/ft}^3 * 0.3 * 454 \text{ g/lb} * 75.4 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = \\ = 7.8^{-3} \text{ Ci Ra 226}$$

Clay Liner

Assume 1 ft from sides, 2 ft from bottom (Utilized 3A clay liner values from - HA198)

U, 42 $\mu\text{gU/g}$

Th 230 = 70 pCi/g

Ra 226 = 0.5 pCi/g

$$18,564 * 2 + 19228 * 1 = 56,356 \text{ ft}^3$$

$$56,356 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 42 \text{ } \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/} \mu\text{g} = 118 \text{ kgU}$$

$$118 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{\text{nat}} = 0.08 \text{ Ci } U_{\text{nat}}$$

$$56,356 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 70 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.20 \text{ Ci Th 230}$$

$$56,356 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 0.5 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = \\ = 0.001 \text{ Ci Ra 226}$$

11. Emergency Basin/North Ditch

Dimensions: (Calculated from facility map)

Emergency Basin Wetted Area = 38,125 ft^2

Emergency Basin Diked Area = 65,000 ft^2

North Ditch Wetted Area = 13,050 ft^2

North Ditch Diked Area = 35,000 ft^2

Volumes:

Assume:

Emergency Basin Sediment @ 4.6 inches thick

$$38,125 \text{ ft}^2 * 4.6 \text{ inches/12 inches/ft} = 14,600 \text{ ft}^3$$

Emergency Basin Contaminated Soils - Est. 2.5 ft
 $65,000 \text{ ft}^2 * 2.5 \text{ ft} = 162,500 \text{ ft}^3$

North Ditch Sediment @ 19.1 inches thick
 $13,050 \text{ ft}^2 * 19.1 \text{ inches}/12 \text{ inches}/\text{ft} = 20,770 \text{ ft}^3$

North Ditch Contaminated Soils - est. 2.5 ft
 $35,000 \text{ ft}^2 * 2.5 \text{ ft} = 87,500 \text{ ft}^3$

Activity:

Emergency Basin Sediment

Uranium = 5793 $\mu\text{gU/g}$ (Avg. of Unit 6 Source data)
Thorium 230 = 19,650 pCi/g (estimated)
Radium 226 = 349 pCi/g (estimated)

$$14,600 \text{ ft}^3 * 70 \text{ lb}/\text{ft}^3 * 0.3 * 454 \text{ g}/\text{lb} * 5,793 \mu\text{gU}/\text{g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 806.3 \text{ kgU}$$

$$806.3 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci}/\text{kg } U_{\text{nat}} = 0.54 \text{ Ci } U_{\text{nat}}$$

$$14,600 \text{ ft}^3 * 70 \text{ lb}/\text{ft}^3 * 0.3 * 454 \text{ g}/\text{lb} * 33,900 \text{ pCi}/\text{g} * 1 \times 10^{-12} \text{ Ci}/\text{pCi} = 4.71 \text{ Ci Th 230}$$

$$14,600 \text{ ft}^3 * 70 \text{ lb}/\text{ft}^3 * 0.3 * 454 \text{ g}/\text{lb} * 892 \text{ pCi}/\text{g} * 1 \times 10^{-12} \text{ Ci}/\text{pCi} = 0.123 \text{ Ci Ra 226}$$

Emergency Basin Contaminated Soils

Uranium, 143 $\mu\text{gU/g}$ (Avg. Unit 6 Soils)
Thorium 230, negligible
Radium 226, negligible

$$162,500 \text{ ft}^3 * 110 \text{ lb}/\text{ft}^3 * 454 \text{ g}/\text{lb} * 143 \mu\text{gU}/\text{g} * 1 \times 10^{-9} \text{ kg}/\mu\text{g} = 1160.5 \text{ kgU}$$
$$1160.5 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci}/\text{kg } U_{\text{nat}} = 0.78 \text{ Ci } U_{\text{nat}}$$

North Ditch Sediment

Uranium = 5,794 $\mu\text{gU/g}$ (Avg. Unit 9 Sources)
Thorium 230 = 698 pCi/g (estimated)
Radium 226 = 170 pCi/g (estimated)

$$20,770 \text{ ft}^3 * 70 \text{ lb/ft}^3 * 0.3 * 454 \text{ g/lb} * 5,794 \text{ } \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/}\mu\text{g} = 1147.3 \text{ kgU}$$

$$1147.3 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{\text{nat}} = 0.77 \text{ Ci } U_{\text{nat}}$$

$$20,770 \text{ ft}^3 * 70 \text{ lb/ft}^3 * 0.3 * 454 \text{ g/lb} * 698 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.137 \text{ Ci Th 230}$$

$$20,770 \text{ ft}^3 * 70 \text{ lb/ft}^3 * 0.3 * 454 \text{ g/lb} * 170 \text{ pCi/g} * 1 \times 10^{-12} \text{ Ci/pCi} = 0.033 \text{ Ci Ra 226}$$

North Ditch Contaminated Soils

Uranium, 102 $\mu\text{gU/g}$ (Avg. Unit 9 Soil)
 Thorium 230, negligible
 Radium 226, negligible

$$87,500 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 102 \text{ } \mu\text{gU/g} * 1 \times 10^{-9} \text{ kg/}\mu\text{g} = 446 \text{ kgU}$$

$$446 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg } U_{\text{nat}} = 0.3 \text{ Ci } U_{\text{nat}}$$

12. Solid Waste Burials

From plant records maintained in the decommissioning file, the volumes and uranium contents of these burial areas is as follows:

Burial Area #1 (south)	Burial Area #2 (north)
Volume = 43,000 ft^3	Volume = 8,100 ft^3
Uranium = 945 kg or 0.64 Ci U_{nat}	Uranium = 60 kg or 0.041 Ci U_{nat}

13. Buildings, Equipment, Structures and Concrete

As a preliminary estimate for buildings, equipment and structures, the volume of each building or structure was calculated from external dimensions. The volume to be disposed of was then assumed to be 20 % of the building volume. See attached sketches for dimensions used.

Main Plant Building:	Floor Area	81,100 ft ²	Volume	2,178,300 ft ³
Solvent Extraction Building:	Floor Area	4,500 ft ²	Volume	180,000 ft ³
DUF ₄ Building	Floor Area	8,750 ft ²	Volume	281,250 ft ³
Misc. Digest Bldg:	Floor Area	3,000 ft ²	Volume	75,000 ft ³
Laundry Building:	Floor Area	1,250 ft ²	Volume	12,500 ft ³
Raffinate Loadout Bldg.:	Floor Area	1,000 ft ²	Volume	15,000 ft ³
Cooling Tower:	Pad Area	1,500 ft ²	Volume	30,000 ft ³
RCC Evaporator:	Pad area	625 ft ²	Volume	18,750 ft ³
Bechtel Building:	Floor Area	2,250 ft ²	Volume	27,000 ft ³
Solid Waste Building	Floor Area	1,500 ft ²	Volume	18,000 ft ³
Incinerator:	Floor Area	500 ft ²	Volume	7,500 ft ³
Totals	Area	105,975 ft ²	Volume	2,843,300 ft ³

Disposal Volume @ 20% of Original = 568,660 ft³

Concrete and asphalt volumes were estimated by calculating the surface area from a site map (Drawing #3 from the FEI) and applying an approximate average thickness of 12 inches. (See copy of attached marked-up drawing.)

Concrete/Asphalt Volume = 511,795 ft³

Total Volume = 1,080,455 ft³

Uranium holdup has not been determined. Since some uranium recovery and decon is planned, an assumed average residual uranium of 250 µgU/g and an bulk density of 200 lb/ft³ were used to estimate the amount of uranium remaining.

$$1,080,455 \text{ ft}^3 * 200 \text{ lb/ft}^3 * 454 \text{ g/lb} * 250 \text{ µgU/g} * 1 \times 10^{-9} \text{ kg/µg} = 24,500 \text{ kgU}$$

$$24,500 \text{ kgU} * 6.7 \times 10^{-4} \text{ Ci/kg U}_{\text{nat}} = 16.4 \text{ Ci U}_{\text{nat}}$$

14. Contaminated Soil and Bedrock

The volumes of uranium impacted soils and bedrock were calculated using the isopleth maps for uranium distribution from the FEI (figures 104 through 110 from the FEI). The surface areas encompassed by the >40 µgU/g contour was determined for each sampling interval. These areas were then multiplied by the thickness of the sampling interval to determine volume. As a conservative measure, no adjustments in volume were made for displacements such as the clarifiers, sanitary lagoon, emergency basin, etc. It was assumed for calculational purposes that the concentrations were uniform through the depth of the individual sampling intervals.

Soils and Bedrock > 40 µgU/g

Interval (ft)	Area	Volume
0 - 1	0.916	0.916
1 - 5	0.507	2.028
5 - 10	0.050	0.250
10 - 15	0.049	0.245
15 - 20	0.019	0.095
20 - 25	0.000	0.000
25 - 30	0.008	0.040
Totals	-----	3.574

To approximate the quantity of uranium in the soil/bedrock, a value of 375 µgU/g soil was assigned as an approximate overall average (15% @ 2500, 85% @ 100 µgU/g).

$$3,574,000 \text{ ft}^3 * 110 \text{ lb/ft}^3 * 454 \text{ g/lb} * 375 \text{ µgU/g} * 1 \times 10^{-9} \text{ Kg/g} = 66,932 \text{ Kg}$$

$$66,932 \text{ KgU} * 6.7 \times 10^{-4} \text{ Ci/Kg U}_{\text{nat}} = 44.8 \text{ Ci U}_{\text{nat}}$$

15. Estimation of Soil Volumes at Proposed Uranium Cleanup Criteria

Volume estimates were made for U_{Nat} soil concentrations of 40, 200, 325, and 1300 µg/g outside the footprint of the disposal cell using the uranium isopleths generated by AutoCAD or by hand drawing approximate contours on the Facility map. The footprint of the proposed disposal cell was then placed onto the contour map. AutoCad was used to determine the area within each contour outside of the disposal cell footprint. These volume estimates and associated soil concentration values were then loaded into Lotus Freelance™ in order to fit a curve to the data pairs. Power regression ($y = ax^b$) was selected for this purpose. The following information was generated about the curve by the power regression method:

$$b = -1.104896$$

$$a = 1.2 \times 10^8$$

$$R^2 = 0.9888573$$

An R^2 of one (1) indicates a precise fit. Thus, the regression curve drawn fits the data well. Next, the cleanup concentration was input to the power equation solving for the vol-

ume associated with this concentration level. A volume was then calculated for the cleanup criteria selected (162 µg/g).

$$y = ax^b, \text{ where}$$

$$y = \text{volume, cf}$$

$$a = 1.2 \times 10^8$$

$$b = -1.104896$$

$$x = 162 \text{ } \mu\text{g/g}$$

Solving for y,

$$y = 1.2 \times 10^8 \times (162)^{-1.104896}$$

$$y = 434407$$

Therefore, an estimated 434,407 cf of soil will have to be removed from areas outside the cell footprint during remediation of the site.

Summary of Material Volume and Activity Estimates

Material	Volume-ft ³	U-Ci	U-kg ¹	Ra-226	Th-230
Soils >40 µgU/g (Facility Action Level)	3,574,000	44.80	66,932	neg.	neg.
Buildings, Equipment, Structures and Concrete	1,080,455	16.40	24,500	neg.	neg.
Calcium Fluoride Sludge	625,280	4.55	6,783	0.006	0.039
CaF ₂ Basin Clay Liners	95,285	0.06	95	neg.	neg.
Raffinate Sludge	1,100,000	37.14	54,861	0.7	60.4
Scrap Metal	100,000	0.15	227	neg.	neg.
Pond 2 Residual Materials	749,000	10.80	16,100	1.60	48.0
Solid Waste Burials	51,100	0.68	1,005	neg.	neg.
Pond 1 Spoils Pile	437,400	0.11	157	.05	1.0
Interim Storage Cell	154,887	2.89	4,323	neg.	neg.
Pond 3E Clay Liner	88,232	0.02	33	neg.	0.1
Clarifier Clay Liners	332,400	0.47	697	0.01	1.2
Drummed Contaminated Trash ⁽²⁾	6,250	0.38	1,054	neg.	neg.
Empty Drums (crushed)	2,000	0.02	22	neg.	neg.
Sanitary Lagoon Sediment	10,365	1.28	1,909	.01	0.5
Sanitary Lagoon Clay Liner	56,356	0.08	118	neg.	neg.
Chipped Pallets	3,000	neg.	neg.	neg.	neg.
Emergency Basin Sediment	14,600	0.54	806	.12	4.7
Emergency Basin Soil	162,500	0.78	1,161	neg.	neg.
North Ditch Sediment	20,770	0.77	1,147	0.03	0.1
North Ditch Soil	87,500	0.3	446	neg.	neg.
Totals	8,751,383	122.22	182,377	2.53	116.0

¹ The plant uranium material balance indicates that there should be 259,687 kg of uranium at the Facility. The difference between this quantity and that estimated above (259,687 - 182,377 = 77,310 kg) is assumed to be primarily associated with equipment holdup

² Includes DUF₄ trash

³ Subject to change as estimates are replaced with more accurate data

Note neg = negligible