NMC
Committed to Nuclear Excellence

Palisades Nuclear Plant
Operated by Nuclear Management Company, LLC

March 13, 2006

Technical Specification 5.6.8

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

Response to Request for Additional Information (RAI) on Steam Generator Tube Integrity Assessment from the 2004 Refueling Outage

By letter dated October 4, 2005, Nuclear Management Company, LLC provided the Palisades Nuclear Plant (PNP) Steam Generator Tube Integrity Assessment Report for the 2004 refueling outage. By letter dated January 12, 2006, the Nuclear Regulatory Commission (NRC) issued a RAI on the subject report. Enclosure 1 provides the RAI responses for the PNP.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

Paul A. Harden
Site Vice President, Palisades Nuclear Plant
Nuclear Management Company, LLC

Enclosures (3)

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

27780 Blue Star Memorial Highway • Covert, Michigan 49043-9530
Telephone: 269.764.2000

ENCLOSURE 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
PALISADES NUCLEAR PLANT

Nuclear Regulatory Commission (NRC) Request

1. *In a conference call with the NRC staff on August 31, 2004, Nuclear Management Company (NMC) indicated that rotating-probe inspections were to be performed on the square bend region of tubes surrounding tube R99C140 in E-50B. Please discuss the results of these inspections.*

Nuclear Management Company, LLC (NMC) Response

1. NMC discovered that the October 4, 2005 report is missing indications. Only 751 of 856 of the reported indications in Steam Generator E-50A and 681 of 899 of the reported indications in Steam Generator E-50B were provided to the NRC. This condition was entered into the NMC corrective action program. The missing indications for each SG are provided as Enclosure 2 and Enclosure 3.

   During the 1999 refueling outage, in Steam Generator E-50B, one tube, R99 C140, had a 67% wear indication. This indication was evaluated and satisfied the structural integrity performance criterion for PNP steam generator tubing.

   Rotating-probe inspections were performed on the square bend region of the tubes surrounding tube R99 C140 using a +Point™ exam. This was performed to ensure that no tube to tube contact was occurring with additional operation. 100% bobbin inspection was also performed on all active tubes in this steam generator in the 2004 refueling outage. In addition, all four adjacent tubes to tube R99 C140 were +Point™ tested from the top eggcrate support (05H) through vertical strap VS1, which included the entire square bend region on the hot leg side. Only one wear indication measuring 13% was reported from bobbin on an adjacent tube at the diagonal bar hot side (DBH). This was confirmed as wear with +Point™ testing.

NRC Request

1. *On page three of NMC's October 4, 2005, report, NMC indicated that it identified possible loose-parts indications during the inspection. Please discuss whether a foreign object search and retrieval (FOSAR) was performed on each steam generator (SG), and whether the loose parts were removed. If the parts were not removed, or the locations were not visually inspected, please discuss the results of any evaluations performed to ensure these parts (or suspected parts) would not result in a loss-of-tube-integrity for the period between inspections.*

NMC Response

2. FOSAR operations were performed in each steam generator. Two objects that potentially could have impacted steam generator tube integrity were successfully removed from the steam generators. The remaining objects identified were either sufficiently small or of a non damaging nature (i.e., sludge collars, small sludge rocks, etc) such that tube wear is not expected. No tube wear was reported at the top of tubesheet for the 2004 refueling outage. All possible loose-part (PLP) locations identified and immediately surrounding tubes were +Point™ tested. No degradation was reported.

NRC Request

3. Table 1 of NMC's October 4, 2005, report indicates that various signals were reported as distorted support indications, non-quantifiable indications and DNI. Please clarify what indications are classified as DNI.

NMC Response

3. A DNI is a dent or ding with an indication. All DNI indications from bobbin are +Point™ tested. Table 1 below shows the indications classified as DNI.

NRC Request

4. For the single axial indications, please supply the following information:

a. Discuss the location of the flaw relative to the support structure (i.e., at support or in free span).

b. Discuss whether there were any dents/dings at these locations. If so, provide the dent/ding voltage.

c. Discuss the severity of the flaws, and whether they initiated from the inside or outside diameter.

d. Discuss whether these indications were found with a bobbin or a +Point™ coil.

NMC Response

4. a. See additional details in the Location column of Table 1 below.

b. See additional details in the Bobbin column of Table 1 below.

c. See additional details in the +Point™ column of Table 1 below.

d. All six indications were initially identified with the bobbin probe as DNI, DSI or NQI. All six indications were subsequently +Point™ coil tested and characterized as SAI.

Table 1

				Bobbin	+Point™
S/G	**Row**	**Col**	**Location**	**Flaw Type Voltage Ding/Dent Voltage**	**Flaw Type Voltage Mechanism**
E-50A	1	4	04H +22.66" Freespan	NQI 0.47 volt No Ding	SAI 0.28 volt ODSCC
E-50A	55	28	DBH+8.97" Freespan in square bend	DNI 0.44 volt 1.58 volt Ding	SAI 0.36 volt ODSCC
E-50A	78	79	07C-0.81" Eggcrate Support	DSI 1.07 volts No Ding	SAI 0.43 volt ODSCC
E-50A	115	110	TSH+15.54" Freespan	NQI 0.20 volt No Ding	SAI 0.23 volt ODSCC
E-50A	80	123	06H+1.98" Freespan	NQI 0.17 volt No Ding	SAI 0.19 volt ODSCC
E-50B	78	149	VS5+16.27" Freespan in square bend	DNI 0.67 volt 2.12 volt Ding	SAI 0.59 volt ODSCC

Table 2 Three Letter NDE Codes

Three Letter Code	NDE Term
DSI	Distorted Support Indication
DNI	Dent or Ding With Indication
NQI	Non Quantifiable Indication
PLP	Possible Loose Part
SAI	Single Axial Indication
WAR	Wear

NRC Request

5. *A number of indications were reported in SGs A and B. Please summarize the mechanisms responsible for these indications (e.g., wear at vertical straps, wear at tube eggcrate supports, etc.). Please provide your eggcrate support thickness (i.e., axial extent), and discuss how your eddy-current measurements are referenced. For example, does "2H + 0.85" indicate that the indication is 0.85-inch from the middle of the second hot-leg support? In addition, please discuss whether any of the indications near the eggcrate supports are in the free span.*

NMC Response

5. The mechanisms responsible for these indications were attributable to wear damage at vertical straps, diagonal bars and tube eggcrate supports.

   The eggcrate support thickness (axial dimension) is 2.00 inches; the individual straps comprising the eggcrate structure are 0.090 inch thick. The tube bundle is supported by stainless steel eggcrate lattice type supports comprised of horizontal eggcrate supports, vertical straps and diagonal bars.

   Standard eddy current practice defines the center of a structure as 0.00 inch elevation. Therefore, an elevation report of 2H +0.85 represents an elevation 0.85 inch above the center of the structure.

   The free span indication locations are shown in Table 1 above.

NRC Request

6. *Please discuss the case of the single volumetric indications identified in R21C62 and R27C120 in SG E-50A. In addition, please discuss the severity of these indications.*

NMC Response

6. There were two indications of wear (WAR) which were reported from the > 5.0 volt ding/dent +Point™ rotating coil program. These two tubes, R21 C62 and R27 C120 in SG E-50A, were reported to contain indications of WAR at the VS4 location, coincident with a dent signal. The +Point™ signals were suggestive of low-level structure wear, and were not overlapping with the dent signal. Due to the indicated shallow depth of the structure wear signal and influence of the dent, the bobbin coil did not identify the potential wear signal. A qualified wear depth sizing procedure does not exist for justification of continued operation, therefore these tubes were reported as single volumetric indication (SVI) and conservatively repaired by plugging.

The two plugged WAR indications were sized using the +Point™ using both the tapered wear scars on the ASME standard and using an EPRI volumetric standard containing flaws that were much shorter than the actual wear in the tubes to determine a conservative estimate of the wear depth. Using both types of wear depth measurements from +Point™, the depths measured between 12% and 23%.

NRC Request

7. *Please confirm that all inspected tubes had adequate tube integrity at the time of NMC's last inspection.*

NMC Response

7. During the Palisades' Refueling Outage 17 (2004) steam generator tube inspection, no indications exceeding the structural integrity limits for either axial or circumferential degradation or wear (i.e., burst integrity > 3 times normal operating primary to secondary pressure differential across SG tubes) were detected. Therefore, no tubes were identified to contain eddy current indications that could potentially challenge the Reg. Guide 1.121 tube integrity recommendations. Based on the observed degradation and corresponding wear growth rates for Operational Cycle 17, the Palisades SGs are expected to satisfy the NEI 97-06 structural and leakage performance criteria at Operational Cycle 18.

Enclosure 2
Additional Steam Generator E-50A Indications

NO.	S/G	LEG	ROW	COL	PERCENT	LOCATION	ELEV FROM	ELEV TO	STATUS
752	E-50A	H	83	130	9	VS2	0.78	0	<TS
753	E-50A	C	93	130	16	VS2	0.84	0	<TS
754	E-50A	C	93	130	19	03H	-0.87	0	<TS
755	E-50A	C	93	130	20	VS2	-0.75	0	<TS
756	E-50A	C	93	130	21	VS4	-0.69	0	<TS
757	E-50A	C	93	130	35	VS4	0.88	0	<TS
758	E-50A	C	95	130	17	VS2	0.83	0	<TS
759	E-50A	C	107	130	30	VS2	-0.49	0	<TS
760	E-50A	C	111	130	14	04C	-0.22	0	<TS
761	E-50A	C	113	130	26	VS4	-0.42	0	<TS
762	E-50A	C	76	131	18	VS4	0.64	0	<TS
763	E-50A	C	96	131	21	04C	-0.89	0	<TS
764	E-50A	C	110	131	28	DBH	-1.69	0	<TS
765	E-50A	C	31	132	23	VS4	0.68	0	<TS
766	E-50A	C	95	132	17	VS2	0.84	0	<TS
767	E-50A	C	97	132	21	VS4	0.91	0	<TS
768	E-50A	C	92	133	19	04C	0.78	0	<TS
769	E-50A	C	106	133	26	DBC	1.99	0	<TS
770	E-50A	C	108	133	20	04C	0.85	0	<TS
771	E-50A	C	45	134	14	03C	0.58	0	<TS
772	E-50A	C	63	134	17	03C	1.1	0	<TS
773	E-50A	C	69	134	19	06C	-0.95	0	<TS
774	E-50A	C	95	134	21	03C	-0.89	0	<TS
775	E-50A	C	95	134	30	04C	-0.88	0	<TS
776	E-50A	C	97	134	13	VS2	0.96	0	<TS
777	E-50A	C	97	134	23	VS4	1.09	0	<TS
778	E-50A	C	103	134	21	04C	0	0	<TS
779	E-50A	C	107	134	12	VS4	0.97	0	<TS
780	E-50A	C	107	134	21	VS4	-1.02	0	<TS
781	E-50A	C	107	134	29	02C	-0.66	0	<TS
782	E-50A	C	82	135	19	VS3	-0.83	0	<TS
783	E-50A	C	90	135	20	04C	0.79	0	<TS
784	E-50A	C	92	135	23	04C	0.77	0	<TS
785	E-50A	C	104	135	20	03C	0.78	0	<TS
786	E-50A	C	106	135	20	VS4	-0.81	0	<TS
787	E-50A	C	67	136	22	VS3	0.85	0	<TS
788	E-50A	C	69	136	12	VS3	-1.01	0	<TS
789	E-50A	C	93	136	14	03C	-0.8	0	<TS
790	E-50A	C	93	136	16	03C	0.83	0	<TS
791	E-50A	C	95	136	16	VS2	-0.78	0	<TS
792	E-50A	C	95	136	19	VS2	0.9	0	<TS
793	E-50A	C	101	136	16	02C	0.19	0	<TS
794	E-50A	C	56	137	22	03C	0.03	0	<TS

NO.	S/G	LEG	ROW	COL	PERCENT	LOCATION	ELEV FROM	ELEV TO	STATUS
795	E-50A	C	100	137	16	04C	0.76	0	<TS
796	E-50A	C	100	137	16	05C	-0.64	0	<TS
797	E-50A	C	100	137	31	03C	-0.41	0	<TS
798	E-50A	C	65	138	22	04C	-0.16	0	<TS
799	E-50A	C	99	138	14	VS4	0.73	0	<TS
800	E-50A	C	99	138	18	VS4	-0.62	0	<TS
801	E-50A	C	99	138	20	02C	0	0	<TS
802	E-50A	C	101	138	19	VS4	0.65	0	<TS
803	E-50A	C	68	139	18	VS5	-0.6	0	<TS
804	E-50A	C	68	139	29	VS3	-1.08	0	<TS
805	E-50A	C	68	139	33	VS5	0.78	0	<TS
806	E-50A	C	55	140	19	06C	-0.03	0	<TS
807	E-50A	C	99	140	11	03C	-0.72	0	<TS
808	E-50A	C	99	140	16	03C	-0.13	0	<TS
809	E-50A	C	99	140	28	VS4	-0.77	0	<TS
810	E-50A	C	82	141	16	VS3	-0.8	0	<TS
811	E-50A	C	84	141	19	04C	1.02	0	<TS
812	E-50A	C	90	143	29	02C	-0.93	0	<TS
813	E-50A	C	90	143	30	02C	0.11	0	<TS
814	E-50A	C	59	144	20	04C	0.78	0	<TS
815	E-50A	C	61	144	17	DBH	1.61	0	<TS
816	E-50A	C	79	144	17	VS5	0.47	0	<TS
817	E-50A	C	87	144	19	03C	-0.94	0	<TS
818	E-50A	C	32	145	15	VS4	-0.68	0	<TS
819	E-50A	C	70	145	22	DBC	-1.78	0	<TS
820	E-50A	C	88	145	15	VS4	0.63	0	<TS
821	E-50A	C	88	145	24	04C	-0.81	0	<TS
822	E-50A	C	88	145	34	02C	0.2	0	<TS
823	E-50A	C	87	146	20	VS4	-0.69	0	<TS
824	E-50A	C	87	146	21	VS4	0.56	0	<TS
825	E-50A	C	40	147	19	VS4	-0.35	0	<TS
826	E-50A	C	40	147	27	VS4	-0.8	0	<TS
827	E-50A	C	80	147	18	07H	0.67	0	<TS
828	E-50A	C	84	147	20	VS3	0.67	0	<TS
829	E-50A	C	77	148	23	03C	0.85	0	<TS
830	E-50A	C	77	148	28	07H	-0.72	0	<TS
831	E-50A	C	79	148	21	02C	1.08	0	<TS
832	E-50A	C	52	149	18	VS3	0.93	0	<TS
833	E-50A	C	52	149	21	VS4	-0.65	0	<TS
834	E-50A	C	72	149	28	DBH	1.85	0	<TS
835	E-50A	C	1	150	16	02C	0.82	0	<TS
836	E-50A	C	75	150	12	02C	1.03	0	<TS
837	E-50A	C	75	150	21	04C	0.8	0	<TS
838	E-50A	C	77	150	12	02C	0.84	0	<TS
839	E-50A	C	79	150	10	02C	0.78	0	<TS
840	E-50A	C	79	150	14	02C	0.07	0	<TS

NO.	S/G	LEG	ROW	COL	PERCENT	LOCATION	ELEV FROM	ELEV TO	STATUS
841	E-50A	C	79	150	21	VS4	0.96	0	<TS
842	E-50A	C	65	152	17	VS3	0.96	0	<TS
843	E-50A	C	69	152	25	VS3	-0.77	0	<TS
844	E-50A	C	69	152	27	VS3	0.94	0	<TS
845	E-50A	H	70	153	15	VS3	-0.85	0	<TS
846	E-50A	H	67	154	22	04C	0.85	0	<TS
847	E-50A	H	67	154	23	02C	0.86	0	<TS
848	E-50A	C	50	157	25	VS3	0.65	0	<TS
849	E-50A	C	50	157	35	VS3	-0.76	0	<TS
850	E-50A	C	48	159	16	01H	0.08	0	<TS
851	E-50A	H	24	161	26	02C	0.71	0	<TS
852	E-50A	H	32	161	21	DBC	-0.5	0	<TS
853	E-50A	C	29	162	19	01H	-0.73	0	<TS
854	E-50A	H	4	163	16	04H	-1.12	0	<TS
855	E-50A	H	24	163	19	02C	0.82	0	<TS

Enclosure 3
Additional Steam Generator E-50B Indications

NO.	S/G	LEG	ROW	COL	PERCENT	LOCATION	ELEV FROM	ELEV TO	STATUS
682	E-50B	C	100	125	20	VS6	0.5	0	<TS
683	E-50B	C	100	125	24	VS4	0.95	0	<TS
684	E-50B	C	100	125	30	VS2	-0.86	0	<TS
685	E-50B	C	100	125	35	VS2	-0.16	0	<TS
686	E-50B	C	116	125	27	03C	1	0	<TS
687	E-50B	C	33	126	23	VS4	0.53	0	<TS
688	E-50B	H	45	126	14	02C	0.52	0	<TS
689	E-50B	C	47	126	25	VS4	-0.61	0	<TS
690	E-50B	C	47	126	26	VS4	0.56	0	<TS
691	E-50B	C	63	126	21	VS3	0.97	0	<TS
692	E-50B	C	69	126	18	VS5	-0.69	0	<TS
693	E-50B	C	81	126	11	07C	0.85	0	<TS
694	E-50B	C	103	126	12	04H	0.92	0	<TS
695	E-50B	C	103	126	27	VS2	0	0	<TS
696	E-50B	C	103	126	27	VS6	0.53	0	<TS
697	E-50B	C	109	126	12	04H	0.85	0	<TS
698	E-50B	C	109	126	16	VS4	0.85	0	<TS
699	E-50B	C	38	127	21	VS4	0.5	0	<TS
700	E-50B	H	44	127	11	02C	0.65	0	<TS
701	E-50B	H	74	127	18	DBH	-1.47	0	<TS
702	E-50B	H	76	127	16	DBH	-1.41	0	<TS
703	E-50B	C	112	127	25	03C	0.09	0	<TS
704	E-50B	C	114	127	16	03C	0.85	0	<TS
705	E-50B	H	37	128	13	VS4	0.97	0	<TS
706	E-50B	H	37	128	15	VS4	-0.49	0	<TS
707	E-50B	H	47	128	24	VS4	-0.56	0	<TS
708	E-50B	C	69	128	15	03C	0.8	0	<TS
709	E-50B	C	73	128	28	VS4	0	0	<TS
710	E-50B	C	79	128	12	03C	0.82	0	<TS
711	E-50B	H	56	129	15	03C	0.68	0	<TS
712	E-50B	C	70	129	14	06C	-0.86	0	<TS
713	E-50B	C	72	129	15	VS5	-0.66	0	<TS
714	E-50B	H	15	130	20	05C	-0.73	0	<TS
715	E-50B	C	61	130	22	VS3	-0.98	0	<TS
716	E-50B	C	105	130	8	VS6	0.67	0	<TS
717	E-50B	C	105	130	16	03C	0.75	0	<TS
718	E-50B	C	105	130	20	VS2	-0.88	0	<TS
719	E-50B	C	105	130	20	VS2	-0.27	0	<TS
720	E-50B	C	105	130	22	VS2	0.76	0	<TS
721	E-50B	H	107	130	16	03H	0.78	0	<TS
722	E-50B	H	109	130	28	02C	0.98	0	<TS
723	E-50B	C	111	130	25	VS4	0.67	0	<TS
724	E-50B	C	113	130	9	VS4	-0.77	0	<TS
725	E-50B	H	38	131	10	VS4	-0.74	0	<TS
726	E-50B	H	38	131	13	VS4	0.81	0	<TS

727	E-50B	H	44	131	22	03C	0.74	0	<TS
728	E-50B	H	48	131	12	VS4	-0.33	0	<TS
729	E-50B	H	52	131	35	VS5	-0.6	0	<TS
730	E-50B	C	108	131	19	02C	0.8	0	<TS
731	E-50B	C	110	131	6	02C	0.06	0	<TS
732	E-50B	C	110	131	13	02C	0.73	0	<TS
733	E-50B	C	110	131	16	03C	-0.58	0	<TS
734	E-50B	C	110	131	24	03C	0.74	0	<TS
735	E-50B	C	39	132	12	03C	0.94	0	<TS
736	E-50B	C	39	132	34	VS4	0.57	0	<TS
737	E-50B	H	41	132	11	VS4	0.9	0	<TS
738	E-50B	H	43	132	18	VS4	0.75	0	<TS
739	E-50B	C	45	132	11	VS4	0.37	0	<TS
740	E-50B	H	47	132	14	VS4	0.65	0	<TS
741	E-50B	H	47	132	19	VS4	-0.75	0	<TS
742	E-50B	H	53	132	11	02C	0.86	0	<TS
743	E-50B	C	59	132	15	VS4	-0.69	0	<TS
744	E-50B	C	63	132	25	VS3	0.78	0	<TS
745	E-50B	C	71	132	13	VS5	0.75	0	<TS
746	E-50B	C	99	132	15	VS4	0.87	0	<TS
747	E-50B	C	99	132	20	VS2	-0.9	0	<TS
748	E-50B	C	99	132	24	VS2	0.9	0	<TS
749	E-50B	H	107	132	28	03C	0.58	0	<TS
750	E-50B	C	109	132	15	05C	0.79	0	<TS
751	E-50B	C	109	132	20	04C	-0.06	0	<TS
752	E-50B	H	22	133	16	VS4	0.96	0	<TS
753	E-50B	C	100	133	21	VS4	-0.48	0	<TS
754	E-50B	C	108	133	18	02C	0.08	0	<TS
755	E-50B	C	39	134	16	VS4	0.56	0	<TS
756	E-50B	C	39	134	20	VS4	-0.58	0	<TS
757	E-50B	H	41	134	22	03C	0.78	0	<TS
758	E-50B	C	51	134	18	03C	-1.02	0	<TS
759	E-50B	C	67	134	16	03C	0.73	0	<TS
760	E-50B	C	67	134	20	06C	-0.96	0	<TS
761	E-50B	C	69	134	12	VS3	-0.73	0	<TS
762	E-50B	C	69	134	15	VS5	-0.54	0	<TS
763	E-50B	C	69	134	21	VS4	0.63	0	<TS
764	E-50B	C	69	134	25	VS4	-0.72	0	<TS
765	E-50B	C	105	134	22	02C	0.75	0	<TS
766	E-50B	C	46	135	15	VS4	-0.18	0	<TS
767	E-50B	C	64	135	18	VS3	-0.84	0	<TS
768	E-50B	C	98	135	20	VS2	0	0	<TS
769	E-50B	C	98	135	20	VS4	0.8	0	<TS
770	E-50B	C	98	135	22	VS4	-0.66	0	<TS
771	E-50B	C	104	135	16	VS4	0.72	0	<TS
772	E-50B	C	45	136	34	VS4	0.49	0	<TS
773	E-50B	C	63	136	11	VS5	0.83	0	<TS
774	E-50B	C	69	136	10	VS5	-0.69	0	<TS
775	E-50B	C	69	136	13	VS5	0.55	0	<TS

776	E-50B	C	69	136	13	VS4	-0.74	0	<TS
777	E-50B	C	71	136	12	06C	-0.91	0	<TS
778	E-50B	C	99	136	14	04C	0.75	0	<TS
779	E-50B	C	101	136	8	03H	0.74	0	<TS
780	E-50B	C	103	136	20	VS4	0.94	0	<TS
781	E-50B	H	6	137	11	04C	-0.89	0	<TS
782	E-50B	C	96	137	15	VS4	0.75	0	<TS
783	E-50B	C	96	137	16	VS4	-0.45	0	<TS
784	E-50B	C	96	137	20	04C	-0.12	0	<TS
785	E-50B	C	102	137	4	VS4	-0.87	0	<TS
786	E-50B	C	102	137	15	VS4	0.81	0	<TS
787	E-50B	C	63	138	16	03C	0.71	0	<TS
788	E-50B	C	67	138	19	03C	0.81	0	<TS
789	E-50B	C	67	138	21	03C	0	0	<TS
790	E-50B	C	67	138	23	VS3	0	0	<TS
791	E-50B	C	95	138	31	VS4	0.78	0	<TS
792	E-50B	H	99	138	13	DBH	1.95	0	<TS
793	E-50B	C	96	139	9	03C	0.58	0	<TS
794	E-50B	C	96	139	16	03C	-1	0	<TS
795	E-50B	C	96	139	18	VS2	1.03	0	<TS
796	E-50B	C	98	139	11	VS4	-0.66	0	<TS
797	E-50B	C	98	139	15	VS4	0.69	0	<TS
798	E-50B	C	98	139	26	VS4	0.09	0	<TS
799	E-50B	C	45	140	21	VS4	0.59	0	<TS
800	E-50B	C	69	140	15	VS5	0.7	0	<TS
801	E-50B	C	69	140	19	VS5	-0.81	0	<TS
802	E-50B	C	83	140	22	VS3	-0.67	0	<TS
803	E-50B	C	30	141	24	VS4	-0.51	0	<TS
804	E-50B	C	70	141	17	VS3	-0.85	0	<TS
805	E-50B	C	76	141	35	DBH	1.76	0	<TS
806	E-50B	C	78	141	19	VS4	-0.77	0	<TS
807	E-50B	C	78	141	19	VS3	-0.68	0	<TS
808	E-50B	C	96	141	14	VS2	0.88	0	<TS
809	E-50B	C	96	141	14	VS4	0.88	0	<TS
810	E-50B	C	49	142	17	DBC	-0.5	0	<TS
811	E-50B	C	95	142	17	VS6	-0.97	0	<TS
812	E-50B	C	95	142	18	VS4	0.99	0	<TS
813	E-50B	H	68	143	14	06H	1.06	0	<TS
814	E-50B	C	82	143	26	VS4	-0.66	0	<TS
815	E-50B	C	82	143	28	VS3	-0.67	0	<TS
816	E-50B	C	55	144	10	VS3	-0.4	0	<TS
817	E-50B	C	61	144	13	06H	0.75	0	<TS
818	E-50B	C	69	144	16	VS5	-0.79	0	<TS
819	E-50B	H	71	144	13	VS3	0.98	0	<TS
820	E-50B	H	71	144	20	VS3	-1.3	0	<TS
821	E-50B	C	91	144	11	VS4	-0.45	0	<TS
822	E-50B	C	91	144	12	VS2	-0.69	0	<TS
823	E-50B	C	91	144	17	VS4	0.63	0	<TS
824	E-50B	C	38	145	8	VS4	-0.68	0	<TS

825	E-50B	C	38	145	11	VS4	0.65	0	<TS
826	E-50B	C	56	145	15	04C	-0.79	0	<TS
827	E-50B	C	80	145	23	VS5	0.54	0	<TS
828	E-50B	C	80	145	25	VS4	-0.75	0	<TS
829	E-50B	C	82	145	15	VS4	-0.66	0	<TS
830	E-50B	C	82	145	18	VS3	-0.66	0	<TS
831	E-50B	C	82	145	18	VS5	-0.6	0	<TS
832	E-50B	C	82	145	22	VS4	0.81	0	<TS
833	E-50B	C	49	146	24	VS4	-0.33	0	<TS
834	E-50B	C	71	146	15	VS4	0.75	0	<TS
835	E-50B	C	71	146	22	VS5	-0.67	0	<TS
836	E-50B	C	87	146	17	VS4	-0.62	0	<TS
837	E-50B	C	87	146	26	03C	0.67	0	<TS
838	E-50B	C	38	147	15	VS4	0.6	0	<TS
839	E-50B	C	38	147	21	VS4	-0.72	0	<TS
840	E-50B	H	66	147	10	VS3	0.92	0	<TS
841	E-50B	H	66	147	12	VS5	-0.72	0	<TS
842	E-50B	C	37	148	17	VS4	-0.87	0	<TS
843	E-50B	C	45	148	14	VS4	-0.58	0	<TS
844	E-50B	C	45	148	14	VS4	0.63	0	<TS
845	E-50B	C	45	148	21	06C	-0.62	0	<TS
846	E-50B	H	47	148	25	04C	0.62	0	<TS
847	E-50B	H	83	148	21	VS4	-0.82	0	<TS
848	E-50B	H	66	149	21	06H	0.74	0	<TS
849	E-50B	H	80	149	25	01H	-0.75	0	<TS
850	E-50B	C	39	150	20	VS4	0.55	0	<TS
851	E-50B	H	67	150	8	VS3	-0.81	0	<TS
852	E-50B	H	67	150	16	VS3	0.89	0	<TS
853	E-50B	C	69	150	11	VS4	0.96	0	<TS
854	E-50B	C	69	150	12	VS5	0.48	0	<TS
855	E-50B	C	69	150	17	VS5	-0.58	0	<TS
856	E-50B	C	69	150	17	VS3	-0.88	0	<TS
857	E-50B	C	69	150	22	VS3	0.81	0	<TS
858	E-50B	H	77	150	7	VS3	-0.81	0	<TS
859	E-50B	H	77	150	16	VS4	0.55	0	<TS
860	E-50B	H	77	150	21	VS4	-0.9	0	<TS
861	E-50B	H	77	150	24	DBH	1.68	0	<TS
862	E-50B	C	46	151	22	VS4	0.44	0	<TS
863	E-50B	C	68	151	12	VS5	0.62	0	<TS
864	E-50B	C	68	151	14	VS5	-0.42	0	<TS
865	E-50B	C	68	151	32	VS3	-0.68	0	<TS
866	E-50B	C	71	152	11	VS4	0.78	0	<TS
867	E-50B	C	71	152	15	VS3	0.96	0	<TS
868	E-50B	C	71	152	24	VS5	-0.74	0	<TS
869	E-50B	C	71	152	28	VS5	0.98	0	<TS
870	E-50B	C	30	153	10	VS4	-0.6	0	<TS
871	E-50B	C	70	153	12	VS4	0.82	0	<TS
872	E-50B	C	70	153	17	VS4	-0.68	0	<TS
873	E-50B	C	70	153	17	03C	0.05	0	<TS

874	E-50B	C	31	154	23	VS4	0.73	0	<TS
875	E-50B	H	31	154	23	VS4	0.57	0	<TS
876	E-50B	C	37	154	26	VS4	-0.06	0	<TS
877	E-50B	C	41	154	18	VS4	-0.49	0	<TS
878	E-50B	C	41	154	21	VS4	0.58	0	<TS
879	E-50B	C	61	154	15	VS5	0.66	0	<TS
880	E-50B	C	33	156	14	VS4	-0.62	0	<TS
881	E-50B	C	37	156	13	VS4	-1.06	0	<TS
882	E-50B	C	37	156	17	VS4	0.89	0	<TS
883	E-50B	C	51	156	18	VS5	-0.66	0	<TS
884	E-50B	C	50	157	13	01H	-0.95	0	<TS
885	E-50B	C	49	158	16	01C	0.06	0	<TS
886	E-50B	C	44	159	11	01H	-0.87	0	<TS
887	E-50B	C	46	159	17	01C	0.12	0	<TS
888	E-50B	H	1	160	13	04H	0.6	0	<TS
889	E-50B	C	39	160	18	02H	0.85	0	<TS
890	E-50B	H	38	161	26	02H	0.8	0	<TS
891	E-50B	C	22	163	10	02C	0.78	0	<TS
892	E-50B	C	11	164	18	04C	0.93	0	<TS
893	E-50B	C	11	164	22	02C	-1.01	0	<TS
894	E-50B	C	19	164	10	02C	0.84	0	<TS
895	E-50B	C	2	165	15	01C	0.85	0	<TS
896	E-50B	C	6	165	21	02C	-0.98	0	<TS
897	E-50B	C	8	165	17	02C	-0.93	0	<TS
898	E-50B	C	10	165	11	02H	0.74	0	<TS