



מודיעין אנרגיה | Modiin Energy

11 בנובמבר, 2019

מודיעין-אנרגיה – שותפות מוגבלת

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לכבוד	לכבוד
הבורסה לניירות בתל-אביב בע"מ	רשות ניירות ערך
רח' אחוזת בית 2	רח' כנפי נשרים 22
תל-אביב 6525216	ירושלים 95464
באמצעות מגנ"א	באמצעות מגנ"א

ג.א.נ.,

הנדון: דוח הערכת משאבים מנובאים (פרוספקטיביים) ומותנים בפרוספקט Cassini ("הפרוספקט") בפרויקט Cassini, בקליפורניה, ארה"ב ("הפרויקט")

בהמשך לדוח המיידני מיום 5.3.2018 (אסמכתא 2018-01-021133) בדבר דוח הערכת משאבים מנובאים (פרוספקטיביים) ("דוח המשאבים הקודם") בשטח הפרויקט אשר נערך לפני ביצוע קידוח אקספלורציה CASSINI 857Z-34 בשטח הפרויקט ("הקידוח"), לדוח המיידני מיום 8.3.2018 (אסמכתא 2018-01-022333) בדבר החלטת דירקטוריון השותף הכללי בשותפות לאשר את השתתפות השותפות בביצוע הקידוח, לדוח המיידני מיום 10.4.2018 (אסמכתא 2018-01-036079) בדבר התחלת ביצוע הקידוח, לדוח המיידני מיום 29.4.2018 (אסמכתא 2018-01-041764) בקשר עם הקידוח לרבות בדבר החלטה לבצע מבחני הפקה בקידוח ("מבחני ההפקה"), לדוח המיידני מיום 9.7.2018 (אסמכתא 2018-01-061794) בדבר פירוט התכנית לביצוע מבחני ההפקה ולדוח המיידני מיום 22.9.2019 (אסמכתא 2019-01-097654) בדבר סיום מבחני ההפקה (אשר האמור בהם מובא כאן על דרך ההפניה), השותפות מתכבדת להודיע בזאת כי ביום 11.11.2019 קיבלה דוח הערכת משאבים מעודכן ביחס לפרוספקט ("דוח המשאבים המעודכן"). דוח המשאבים המעודכן הוכן על ידי חברת Petrotech Resources Company, Inc, מעריך עתודות מומחה, מוסמך ובלתי תלוי ("המעריך"), נערך על פי כללי המערכת לניהול משאבי פטרוליום (SPE-PRMS)¹ והוא מצורף כנספח לדוח מיידני זה.

להלן עיקרי הנתונים מתוך הדוח המשאבים המעודכן:

משאבים מותנים

1. על פי דוח המשאבים המעודכן, המשאבים המותנים (un-risked Gross (100% (Contingent Resources בשכבת ה-Monterey בפרוספקט, נכון ליום 1.11.2019, הינם כמפורט להלן:

¹ מערכת לניהול משאבי פטרוליום (SPE-PRMS) – "Petroleum Resources Management (2007)" כפי שפורסמה על ידי איגוד מהנדסי הפטרוליום (SPE), הארגון האמריקאי של גיאולוגים בתחום הפטרוליום (AAPG), המועצה העולמית לפטרוליום (WPC) ואיגוד מהנדסי הערכת הפטרוליום (SPEE).

שווה ערך נפט Bbls Oil Equivalent *(³ MMSTB)		גז (³ BCF)		נפט (² MMSTB)		
סה"כ משויך למחזיקי הזכויות ההוניות של השותפות ⁴	סה"כ בנכס הנפט	סה"כ משויך למחזיקי הזכויות ההוניות של השותפות ⁴	סה"כ בנכס הנפט	סה"כ משויך למחזיקי הזכויות ההוניות של השותפות ⁴	סה"כ בנכס הנפט	
0.19-0.20	0.756	0.82-0.88	3.273	0.05-0.06	0.210	האומדן הנמוך Low Estimate (1C)
0.33-0.36	1.339	1.45-1.55	5.798	0.09-0.10	0.373	האומדן הטוב ביותר Best Estimate (2C)
0.59-0.63	2.372	2.56-2.75	10.270	0.16-0.18	0.660	האומדן הגבוה High Estimate (3C)

* ההמרה ליחידות שוות אנרגיה נערכה על פי היחס הבא (כמפורט בדוח המשאבים המעודכן): 6 BCF Gas = 1 MMSTB Oil Equivalent.

אזהרה: יחידות שוות אנרגיה עלולות להיות מטעות בייחוד אם השימוש בהן נערך מבלי להביא בחשבון מאפיינים נוספים. ההמרה מבוצעת לפי יחס אנרגטי בשריפה אך אינה מייצגת שווי כלכלי זהה.

2. בדוח המשאבים המעודכן צוין כי המשאבים המותנים מסווגים בשלב "הצדקת פיתוח בבחינה" (Development Pending), והם מותנים באישור תוכנית פיתוח על ידי השותפים בפרויקט.

בדוח המשאבים המעודכן צוין כי הערכה נוספת של ממצאי הקידוח בשילוב עם מידע רלוונטי אחר עשויה להביא לכך שחלק מהמשאבים המותנים יסווגו מחדש כרזרבות.

3. יש להניח כי ניתן יהיו לשווק נפט מהפרויקט שיהיה באיכות מתאימה ובעלויות הפקה כדאיות, בקלות יחסית. הנפט הוא "commodity" אשר מחירו נקבע בשווקים הבינלאומיים והניתן למכירה בהיקף כמעט בלתי מוגבל בשוק הבינלאומי במחירים אלה.

4. **אזהרה**
אין וודאות כי יהא זה אפשרי מבחינה מסחרית להפיק שיעור כלשהו מהמשאבים המותנים.

2 Million Stock Tank Barrels - מיליוני חביות נפט.

3 Billion Cubic Feet - מיליארד רגל מעוקב.

4 בדוח המשאבים המעודכן לא צוין חלק השותפות במשאבים אלא רק סה"כ משאבים בנכס הנפט. חלק השותפות בטבלה הינו לאחר תשלום תמלוגים החלים על השותפות, והוא חושב בהתאם למפורט בסעיף 1.6.4.5(ב) בדוח התקופתי של השותפות לשנת 2018 אשר פורסם ביום 13.3.2019 (אסמכתא - 2019-01-021604) ("הדוח התקופתי"), באופן שהחלק האפקטיבי המיוחס למחזיקי הזכויות ההוניות בהכנסות מנכס הנפט הינו 26.74% עד החזר הוצאות ו- 24.96% לאחר החזר הוצאות.

יצוין כי נכון למועד דוח המשאבים המעודכן השותפים בפרויקט מוכרים את הנפט והגז המופקים מהקידוח.

משאבים מנובאים (פרוספקטיביים)

5. בדוח המשאבים המעודכן צוין כי בעקבות הסיווג מחדש של חלק מהמשאבים שנכללו בדוח המשאבים הקודם כמשאבים מותנים, עודכנו כמויות המשאבים בפרוספקט שסווגו בדוח הקודם כמשאבים מנובאים (פרוספקטיביים).
6. יצוין כי הנתונים המנובאים נערכו על בסיס סקרים סייסמיים תלת מימדיים שנערכו בשטח הפרויקט במהלך השנים האחרונות ואשר ממצאיהם עובדו ופוענחו לאורך התקופה הנ"ל ואוחדו לסקר שמכיל את הסקרים ועובד מחדש. נתוני הסקרים הסייסמיים כאמור, עיבודם ופיענוחם וממצאי הקידוח, עמדו לרשות המעריך לצורכי הכנת דוח המשאבים המעודכן.
7. על פי דוח המשאבים המעודכן, המשאבים המנובאים (פרוספקטיביים) (un-risked) (Gross (100%) Prospective Resources) בשכבת ה-Monterey בפרוספקט, נכון ליום 1.11.2019, הינם כמפורט להלן:

שווה ערך נפט Bbls Oil Equivalent *(MMSTB)		גז (BCF)		נפט (MMSTB)		
סה"כ משויך למחזיקי הזכויות ההוניות של השותפות ⁴	סה"כ בנכס הנפט	סה"כ משויך למחזיקי הזכויות ההוניות של השותפות ⁴	סה"כ בנכס הנפט	סה"כ משויך למחזיקי הזכויות ההוניות של השותפות ⁵	סה"כ בנכס הנפט	
3.22-3.44	12.882	11.7-12.6	46.983	1.37-1.47	5.502	האומדן הנמוך Low Estimate (10P)
5.7-6.1	22.818	20.8-22.3	83.220	2.23-2.39	8.948	האומדן הטוב ביותר Best Estimate (50P)
10.1-10.8	40.417	36.8-39.4	147.406	3.96-4.24	15.850	האומדן הגבוה High Estimate (90P)

* ההמרה ליחידות שוות אנרגיה נערכה על פי היחס הבא (כמפורט בדוח המשאבים המעודכן): 6 BCF Gas = 1 MMSTB Oil Equivalent.

אזהרה: יחידות שוות אנרגיה עלולות להיות מטעות בייחוד אם השימוש בהן נערך מבלי להביא בחשבון מאפיינים נוספים. ההמרה מבוצעת לפי יחס אנרגטי בשריפה אך אינה מייצגת שווי כלכלי זהה.

⁵ בדוח המשאבים המעודכן לא צוין חלק השותפות במשאבים אלא רק סה"כ משאבים בנכס הנפט. חלק השותפות בטבלה הינו לאחר תשלום תמלוגים החלים על השותפות, והוא חושב בהתאם למפורט בסעיף 1.6.4.5(ב) בדוח התקופתי, באופן שהחלק האפקטיבי המיוחס למחזיקי הזכויות ההוניות בהכנסות מנכס הנפט הינו 26.74% עד החזר הוצאות ו-24.96% לאחר החזר הוצאות.

8. להלן המשתנים הבסיסיים ששימשו לחישוב התרחישים השונים ביחס למשאבים המנובאים בפרוספקט:

Reservoir	Category	Area (Acres)			Net Rock Volume (Acre Feet)			Porosity (Decimal)		
		Low Estimate	Best Estimate	High Estimate	Low Estimate	Best Estimate	High Estimate	Low Estimate	Best Estimate	High Estimate
Monterey	Prospective	500	775	1200	400,000	759,500	1,440,000	0.05	0.06	0.08

Reservoir	Category	Oil Saturation (Decimal)			Form. Vol. Factor (Decimal)			Recovery Factor (Decimal)		
		Low Estimate	Best Estimate	High Estimate	Low Estimate	Best Estimate	High Estimate	Low Estimate	Best Estimate	High Estimate
Monterey	Prospective	0.50	0.53	0.56	1.65	1.46	1.30	0.06	0.07	0.08

9. מרכיבי הסיכון הגיאולוגי ואת סה"כ ההסתברות להצלחה גיאולוגית בשכבת ה-Monterey בפרוספקט בדוח המשאבים המעודכן צוין כי בעקבות הקידוח עודכנו הפרמטרים של מרכיבי הסיכון הגיאולוגי וסה"כ ההסתברות להצלחה גיאולוגית בשכבת ה-Monterey בפרוספקט והם כדלקמן (באחוזים):

שלמות המלכודת (Trap Integrity)	הערכת סלעי המאגר (Reservoir Quality)	איכות סלעי המקור (Source Evaluation)	תזמון/גדידה (Timing/Migration)	סה"כ הסתברות הצלחה גיאולוגית (Probability of Geological Success)
95	95	98	98	87

לדיון בגורמי הסיכון והסיכונים המשמעותיים הכרוכים בהמשך התהליך ראו סעיף 1.21 בפרק תיאור עסקי התאגיד בדוח התקופתי.

10. אומדן להסתברות לשם הפקה מסחרית
נכון למועד דוח המשאבים המעודכן, אין ביכולת השותפות לתת אומדן סטטיסטי להסתברות הפיתוח לשם הפקה מסחרית. דוח המשאבים אינו כולל ניתוח כלכלי של הפרויקט והמשאבים.

11. נימוקי השותפות אודות הבסיס לפרמטרים הבסיסיים ששימשו בחישוב התרחישים הפרמטרים ששימשו בחישוב האומדנים השונים מבוססים, בין היתר, על תוצאות הסקרים הסייסמים, ממצאי הקידוח ומבחני ההפקה וכן על ידע כללי ביחס לשכבות ולמאגרים דומים נוספים באזור ובעולם.

12. אזהרה
אין ודאות כי חלק כלשהו מהמשאבים האפשריים שצוינו אכן יתגלה; אם יתגלה, אין ודאות כי יהא זה אפשרי מבחינה מסחרית להפיק חלק כלשהו מהמשאבים; המידע הפרוספקטיבי אינו בגדר הערכה על אודות עתודות ומשאבים מותנים אותם ניתן יהיה להעריך רק לאחר קידוח הניסיון, אם בכלל.

13. אזהרה בגין מידע צופה פני עתיד – הערכות המעריך בדבר המשאבים שבפרויקט הינן "מידע צופה פני עתיד" כמשמעו בחוק ניירות ערך. ההערכות לעיל מבוססות, בין היתר, על לימוד גיאולוגי וגיאופיזי שנעשה על ידי מומחים של מפעיל הפרויקט וסקרים סייסמים תלת מימדים (3D) שבוצעו בשטח הפרויקט ועל ממצאי הקידוח, והינן בגדר הערכות והשערות מקצועיות בלבד של המעריך ואשר לגביהן לא קיימת כל ודאות. ההערכות וההשערות הנ"ל עשויות להתעדכן ככל שיצטבר מידע נוסף ו/או כתוצאה ממכלול של גורמים הקשורים בפרויקטים של חיפושים והפקה של נפט וכתוצאה מתנאים תפעוליים ו/או תנאי שוק ו/או תנאים רגולטוריים.

"משאבים מותנים (Contingent Resources)" – מוגדרים על פי ה-PRMS ככמויות של הידרוקרבונים שנכון ליום נתון עשויים להיות בני-הפקה ממאגרים ידועים על ידי יישום של תכניות פיתוח, אך שעדיין אינם נחשבים בני-הפקה מבחינה כלכלית, כתוצאה מתנאי אחד או יותר.

"משאבים מנובאים (פרוספקטיביים) (Prospective Resources)" – מוגדרים על פי ה-PRMS ככמויות של הידרוקרבונים שנכון ליום נתון עשויים להיות בני-הפקה ממאגרים שטרם נחשפו.

משאבים מותנים בשלב בשלות (Project Maturity Sub-Class) של "הצדקת פיתוח בבחינה" (Development Pending) מוגדרים על פי ה-PRMS ככאלו המצויים במאגר בו מתקיימות נסיבות להצדקת הפקתם הכלכלית בטווח הנראה לעין.

"MMSTB" – מיליוני חביות נפט בתנאי פני האדמה (Millions of stock tank barrels).

"BCF" – מיליארדי רגל מעוקב (Billions of cubic feet). מידת נפח גז בתנאים סטנדרטיים.

Net Rock Volume – הנפח (נטו) של שכבות הסלע הלכודות במבנה גיאולוגי נתון מעל המגע הידרוקרבונים – מים.

"Porosity (נקבוביות (פורוזיות))" – היחס בין נפח החללים בסלע לנפחו הכולל.

Oil Saturation – אחוז הרווייה של הנפט.

Formation Volume Factor – היחס בין כמות הנפט בתנאי המאגר לנפט בתנאים סטנדרטיים בפני השטח.

Recovery Factor – היחס בין הכמות ברת הפקה מהמאגר לבין הכמות הכללית במאגר (in place).

.15 השוואה בין נתוני הדוח המשאבים המעודכן לבין נתוני הדוח הקודם והסבר על הפערים
דוח המשאבים הקודם נערך לפני ביצוע הקידוח בשטח הפרויקט. דוח המשאבים המעודכן נערך לאחר ביצוע הקידוח בשטח הפרויקט אשר התברר כתגלית לאחר מבחני ההפקה ובהתבסס על תוצאותיו וממצאיו. בעקבות הקידוח, חלק מהמשאבים אשר סווגו בדוח הקודם כמשאבים מנובאים (פרוספקטיביים), סווגו בדוח המשאבים המעודכן כמשאבים מותנים. כמו כן, בעקבות הקידוח עודכנו הפרמטרים של מרכיבי הסיכון הגיאולוגי וסה"כ ההסתברות להצלחה גיאולוגית בשכבת ה-Monterey בפרוספקט.

.9 חוות דעת של מעריך המשאבים
מצורף בזה **כנספת א'** דוח המשאבים המעודכן הכולל את הסכמת המעריך להכללתו בדוח זה.

.10 הצהרת הנהלה
א. תאריך ההצהרה: 11.11.2019 ;

ב. ציון שם התאגיד המדווח: מודיעין-אנרגיה, שותפות מוגבלת ;

ג. שם הנושא בתפקיד להערכת המשאבים: רון מאור, סגן יו"ר הדירקטוריון ומנכ"ל השותף הכללי בשותפות ;

ד. הריני לאשר כי, למיטב ידיעתי, נמסרו למעריך כל הנתונים הרלוונטיים הנדרשים לצורך ביצוע עבודתו ;

- ה. הריני לאשר, כי לא בא לידיעתי כל מידע המצביע על קיום תלות בין המעריך לבין השותפות;
- ו. הריני לאשר, כי למיטב ידיעתי המשאבים שדווחו ע"י המעריך הינם האומדנים הרלוונטיים, הטובים והעדכניים ביותר הקיימים ברשותנו;
- ז. הריני לאשר, כי הנתונים שנכללו בדוח זה נערכו לפי המונחים המקצועיים המנויים בפרק ז' לתוספת השלישית לתקנות ניירות ערך (פרטי התשקיף וטיטת התשקיף – מבנה וצורה), התשכ"ט-1969, ובמשמעות הנודעת להם ב- Resources (2007) Petroleum Management System כפי שפרסמו איגוד מהנדסי הפטרוליום (SPE), הארגון האמריקאי של גיאולוגים בתחום הפטרוליום (AAPG), המועצה העולמית לפטרוליום (WPC) ואיגוד מהנדסי הערכת הפטרוליום (SPEE), כתוקפם בעת פרסום דוח המשאבים המעודכן;
- ח. הריני לאשר, כי לא נעשה שינוי בזהות המעריך שביצע את הגילוי בדבר המשאבים בפרויקט, האחרון שפורסם על-ידי השותפות;
- ט. הריני מסכים להכללת ההצהרה האמורה לעיל בדוח זה.

רון מאור

השותפים בפרויקט ושיעור אחזקותיהם הינם כדקלמן:
השותפות – 35.625%

35.625% - BL Cassini Holdings LLC

28.75% – (המפעיל) Aera Energy LLC

בכבוד רב,

מודיעין-אנרגיה ניהול (1992) בע"מ
השותף הכללי במודיעין-אנרגיה - שותפות מוגבלת
על ידי רון מאור, מנכ"ל וסגן יו"ר דירקטוריון השותף הכללי

November 11, 2019

Mr. Ron Maor-CEO
Modiin Limited Partnership
3 Azrieli Center, Triangle Tower, 42nd Floor
Tel Aviv, 67023

Re: February 1, 2018 Resource Evaluation – Cassini Prospect, South Belridge Area, Kern County, California

Dear Mr. Maor:

This letter of November 11, 2019 relates to Petrotech's estimated gross (100%) prospective resources as of February 1, 2018 for the Cassini prospect located in the South Belridge area, Kern County, California, United States of America. This update report was prepared for the use of Modiin Energy Limited Partnership in filing with the Israel Securities Authority (ISA). All data used in or generated for this report are available for inspection and review only by parties authorized in our office or authorized by Modiin Energy Management (1992) Ltd.

This update has been prepared for use by Modiin Energy Limited Partnership (Modiin) in filing with the ISA; in our opinion the assumptions, data, methods, and procedures used in the preparation of this report are appropriate for such purpose.

Since the date of the original report well 357Z-34 has been successfully production tested as commercial via artificial lift. The testing commenced in September 2018 and was finalized in September 2019. As of the date of this report the well is producing at a stabilized rate of approximately 40 bbls/day oil and 400 Mcf/day gas. This provides sufficient technical basis to re-classify a portion of the exiting Prospective Resources as Contingent Resources. Further evaluation of this well combined with other relevant information may result in a portion of the resources to be reclassified as reserves.

Contingent resources are defined as those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, but the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies. The contingent resources identified in this report are sub-classified as development pending and these resources are contingent upon approval of a development plan by the partners.

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In addition to general technical information available for this area of the southern San Joaquin valley this resource evaluation used data obtained from the 357Z-34 well drilled in the project area. The data include, but not limited to, electric logs, mud logs, production data, and geologic maps. The contingent resources identified in this report have been estimated using probabilistic methods and have not been risked relative to commercial success.

The estimated gross (100%) contingent resources for the Cassini Prospect for the Monterey formation, as of November 1, 2019, are as follows:

Un-Risked Gross (100%) Contingent Resources

<u>Category</u>	<u>Oil (MMSTB)</u>	<u>Gas (BCF)</u>	<u>Bbls Oil Equivalent* (MMSTB)</u>
Low Estimate (1C)	0.210	3.273	0.756
Best Estimate (2C)	0.373	5.798	1.339
High Estimate (3C)	0.660	10.270	2.372

*Gas converted to BOE using ratio of 6 BCF = 1 MMSTB

Based on the successful commercial testing of well 357Z-34, the probability of geologic success for the above contingent resources is 100%.

The reclassification to contingent of the above volumes of resources results in the balance of original estimated gross (100%) prospective resources for the Cassini Prospect for the Monterey formation, as of November 1, 2019, as follows:

Un-Risked Gross (100%) Prospective Resources

<u>Category</u>	<u>Oil (MMSTB)</u>	<u>Gas (BCF)</u>	<u>Bbls Oil Equivalent* (MMSTB)</u>
Low Estimate (10P)	5.052	46.983	12.882
Best Estimate (50P)	8.948	83.220	22.818
High Estimate (90P)	15.850	147.406	40.417

*Gas converted to BOE using ratio of 6 BCF = 1 MMSTB

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Based on the successful commercial testing of well 357Z-34, the geologic risk elements and probabilities associated with the above prospective resources have been updated since the original report and are summarized in the following table:

Prospective Zone	Geologic Risk Elements (%)				Probability of Geologic Success (%)
	Trap Integrity	Reservoir Quality	Source Evaluation	Timing / Migration	
Monterey	95%	95%	98%	98%	87%

All resource estimates are functions of engineering data, judgement, and interpretation and should be accepted with the understanding that events subsequent to the effective date could necessitate revisions. The estimates of resources in this report were based upon a detailed study of the subject property and sound engineering practices. The accuracy of resource evaluation is subject to uncertainty and the estimates in this report were prepared using sound petroleum engineering principles based on a technical analysis of the available data. Additional information available after the effective date of this resource evaluation may justify revisions.

Neither Petrotech nor any of its staff have any personal, corporate, or fiduciary interest in the subject property, Modiin Energy Management (1992) Ltd., or Modiin Energy-Limited Partnership. Neither the employment to make this study nor the compensation is contingent on Petrotech's conclusions or estimates of resources associated with the subject property.

Sincerely,


 Bradford A. DeWitt,
 P.E., P1804 State of California



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PETROLEUM RESERVES AND RESOURCES CLASSIFICATION AND DEFINITIONS

Excerpted from the Petroleum Resources Management System Approved by the Society of Petroleum Engineers (SPE) Board of Directors, March 2007

This document contains information excerpted from definitions and guidelines prepared by the Oil and Gas Reserves Committee of the Society of Petroleum Engineers (SPE) and reviewed and jointly sponsored by the World Petroleum Council (WPC), the American Association of Petroleum Geologists (AAPG), and the Society of Petroleum Evaluation Engineers (SPEE).

Preamble

Petroleum resources are the estimated quantities of hydrocarbons naturally occurring on or within the Earth's crust. Resource assessments estimate total quantities in known and yet-to-be-discovered accumulations; resources evaluations are focused on those quantities that can potentially be recovered and marketed by commercial projects. A petroleum resources management system provides a consistent approach to estimating petroleum quantities, evaluating development projects and presenting results within a comprehensive classification framework.

These definitions are guidelines are designed to provide a common reference for the international petroleum industry, including national reporting and regulatory disclosure agencies, and to support petroleum project and portfolio management requirements. They are intended to improve clarity on global communications regarding petroleum resources. It is expected that this document will be supplemented with industry education programs and the application guides addressing their implementation in a wide spectrum of technical and/or commercial settings.

It is understood that that these definitions and guidelines allow flexibility for users and agencies to tailor application for their particular needs; however, any modifications to the guidance contained herein should be clearly identified. The definitions guidelines contained in this document must not be constructed as modifying the interpretation or application of any existing regulatory reporting requirements.

1.0 Basic Principles and Definitions

The estimation of petroleum resource quantities involves the interpretation of volumes and values that have an inherent degree of uncertainty. These quantities are associated with the development projects at various stages of design and implementation. Use of a consistent classification system enhances comparisons between projects, groups of projects, and total company portfolios according to forecast production profiles and recoveries. Such a system must consider both technical and commercial factors that impact the projects economic feasibility, its productive life and its related cash flow.

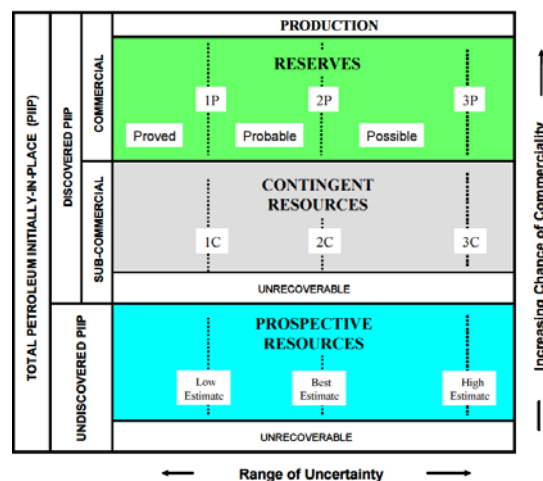
1.1 Petroleum Resources Classification Framework

Petroleum is defined as a naturally occurring mixture consisting of hydrocarbons in the gaseous, liquid, or solid phase. Petroleum may also contain non-hydrocarbons, common examples of which are carbon dioxide, nitrogen, hydrogen sulfide and sulfur. In rare cases, non-hydrocarbon content could be greater than 50%.

The term "resources" as used in intended to encompass all quantities of petroleum naturally occurring on or within the Earth's crust, discovered and undiscovered (recoverable and unrecoverable), plus those quantities already produced. Further, it includes all types of petroleum whether currently considered "conventional" or "unconventional."

Figure 1-1 is a graphical representation of the SPE/WPC/AAPG/SPEE resources classification system. The system defines the major recoverable resources classes: Production, Reserves, Contingent Resources, and Prospective Resources, as well unrecoverable petroleum.

"The Range of Uncertainty" reflects a range of estimated quantities potentially recoverable from an accumulation by project, while the vertical axis represents the "Chance of Commerciality", that is, the chance that the project that will be developed and reach commercial producing status. The following definitions apply to the major subdivisions within the resources classification.



TOTAL PETROLEUM INITIALLY-IN-PLACE is that quantity of petroleum that is estimated to exist originally in naturally occurring accumulations. It includes that quantity of petroleum that is estimated, as of a given date, to be contained in known accumulations prior to production plus those estimated quantities in accumulation yet to be discovered (equivalent to "total resources")

DISCOVERED PETROELUM INITALLY-IN-PLACE is that the quantity of petroleum that is estimated, as of a given date, to be contained in known accumulation prior to production.

PRODUCTION is the cumulative quantity of petroleum that has been recovered at a given date. While all recoverable resources are estimated and production is measured in terms of the sales product specifications, raw production (sales plus non-sales) quantities are also measured and required to support engineering analyses based on reservoir voidage (see production Measurement, section 3.2).

Multiple development projects may be applied to each known accumulation, and each project will recover an estimated portion of the initially-in-place quantities. The projects shall be subdivided into Commercial and Sub-Commercial, with the estimated recoverable quantities being classified as Reserves and Contingent Resources respectively, as defined below.

RESERVES are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must further satisfy four criteria: they must be discovered, recoverable, commercial, and remaining (as of the evaluation date) based on the development project(s) applied. Reserves are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by the development and production status.

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COTNINGENT RESOURCES are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, but the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies. Contingent resources may include, for example, projects for which there are no viable markets, or where commercial development is dependent of technology under development, or where evaluation of the accumulation is insufficient to clearly assess commerciality. Contingent Resources are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their economic status.

UNDISCOVERED PETROLEUM INITIALLY-IN-PLACE is that quantity of petroleum estimated, as of a given date, to be contained within accumulations yet to be discovered.

PROSPECTIVE RESOURCES are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects. Prospective Resources have both an associated chance of discovery and a chance of development. Prospective Resources are further subdivided in accordance with the level of certainty associated with recoverable estimates assuming their discovery and development and may be sub-classified based on project maturity.

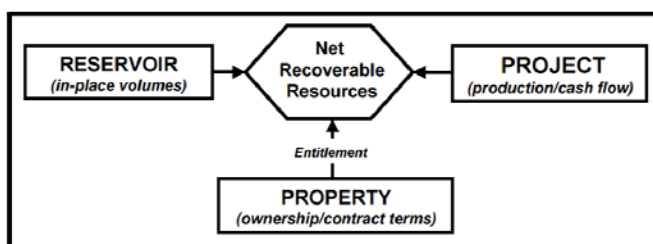
UNRECOVERABLE is that portion of Discovered or Undiscovered Petroleum Initially-in-place quantities which are estimated, as of a given date, not to be recoverable by future development projects. A portion of these quantities may become recoverable in the future as commercial circumstances change or technological developments occur, the remaining portion may never be recovered due to physical/chemical constraints represented by subsurface interaction of fluids and reservoir rocks.

Estimated Ultimate Recovery (EUR) is not a resources category, but a term that may be applied to any accumulation or group of accumulations (discovered or undiscovered) to define those quantities of petroleum estimated, as of a given date, to be potentially recoverable under defined technical and commercial conditions plus those quantities already produced (total of recoverable resources).

1.2 Project-Based Resources Evaluations

The resources evaluation process consists of identifying a recovery project, or projects, associated with a petroleum accumulation(s), estimating the quantities of petroleum Initially-in-Place, estimating that portion of those in place quantities that can be recovered by each project, and classifying the project(s) based on its maturity status or chance of commerciality.

This concept of a project based classification system is further clarified by examining the primary data sources contributing to an evaluation of net recoverable resources (see figure 1-2) that may be described as follows:



The Reservoir (accumulation): Key attributes include the types and quantities of petroleum initially-in-place and the fluid and rock properties that affect petroleum recovery.

The Project: Each project applied to a specific reservoir development generates a unique production and cash flow schedule. The time integration of these schedules taken to the projects technical, economic, or contractual limit defines the estimated recoverable resources and associated future net cash flow projections for each project. The ratio of EUR to Total Initially-in-Place quantities defines the ultimate recovery efficiency for the development project(s). A project may be defined at various levels and stages of maturity: it may include one or many wells and associated production and processing facilities. One project may develop many reservoirs, or many projects may be applied to one reservoir.

The property (lease or license area): Each property may have unique associated contractual rights and obligations including fiscal terms. Such information allows definition of each participant's share of produced quantities (entitlement) and share of investments, expenses, and revenues for each recovery project and the reservoir to which it is applied. One property may encompass many reservoirs, or one reservoir may span several properties. A property may contain both discovered and undiscovered accumulations.

In context of this data relationship, "project" is the primary element considered in this resources classification, and net recoverable resources are the incremental quantities derived from each project. Project represents the link between the petroleum accumulation and the decision-making process. A project may, for example, constitute the development of a single reservoir or field, or an incremental field, or the integrated development for a producing field, or the integrated development of several fields and associated facilities with a common ownership. In general, an individual project will represent the level at which a decision is made whether or not to proceed (i.e. spend more money) and there should be an associated range of estimated recoverable quantities for that project.

An accumulation or potential accumulation of petroleum may be subject to several separate and distinct projects that are at different stages of exploration or development. Thus, an accumulation may have recoverable quantities in several resource classes simultaneously.

In order to assign recoverable resources of any class, a development plan needs to be defined consisting of one or more projects. Even for Prospective Resources, the estimates of recoverable quantities must be stated in the terms of the sales products derived from a development program assuming successful discovery and commercial development. Given the major uncertainties involved at this early stage, the development program will not be of the detail expected in the later stages of maturity. In most cases, recovery efficiency may be largely based on analogous projects. In-place quantities for which a feasible project cannot be defined using current or reasonably forecast improvements in, technology are classified as Unrecoverable.

Not all technically feasible development plans will be commercial. The commercial viability of a development project is dependent on a forecast of the conditions that will exist during the time period encompassed by the projects activities (see Commercial Evaluations, section 3.1). "Conditions" include technological, economic, legal, environmental,

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social, and governmental factors. While economic factors can be summarized as forecast costs and product prices, the underlying influences include, but are not limited to, market conditions, transportation and processing infrastructure, fiscal terms, and taxes.

The resources quantities being estimated are those volumes producible from a project as measured according to delivery specifications at the point of sale or custody transfer (see Reference Point, section 3.2.1). The cumulative production from the evaluation date forward to cessation of production is the remaining recoverable quantity. The sum of associated annual net cash flows yields the estimated future net revenue. When the cash flows are discounted according to a defined discount rate and time period, the summation of discounted cash flows is termed net present value (NPV) of the project (see Evaluation and Reporting Guidelines, section 3.0).

The supporting data, analytical processes, and assumptions used in an evaluation should be documented in sufficient detail to allow an independent evaluator or auditor to clearly understand the basis for estimation and categorization of recoverable quantities and their classification.

2.0 Classification and Categorization Guidelines

2.1 Resources Classification

The basic classification requires establishment of criteria for a petroleum discovery and thereafter the distinction between commercial and sub commercial projects in known accumulations (and hence between Reserves and Contingent Resource).

2.1.1 Determination of Discovery Status

A discovery is one petroleum accumulation, or several petroleum collectively, for which one or several exploratory wells have established through testing, sampling, and/or logging the existence of a significant quantity potentially moveable hydrocarbons.

In this context, "significant" implies that there is evidence of a sufficient quantity of petroleum to justify estimating the in-place volume demonstrated by the well(s) and for evaluating the potential for economic recovery. Estimated recoverable quantities within such a discovered (known) accumulation(s) shall initially be classified as Contingent Resources pending definition of projects with a sufficient chance of commercial development to reclassify all, or a portion, as Reserves. Where in-place hydrocarbons are identified but are not considered currently recoverable, such quantities may be classified as Discovered Unrecoverable, if considered appropriate for resource management purposes; a portion of these quantities may become recoverable resources in the future as commercial circumstances change or technological developments occur.

2.1.2 Determination of Commerciality

Discovered recoverable volumes (Contingent Resources) may be considered commercially producible, and thus Reserves, if the entity claiming commerciality has demonstrated firm intention to proceed with the development and such intention is based upon all of the following criteria:

- Evidence to support a reasonable timetable for development.
- A reasonable assessment of the future economics of such development projects meeting defined investment and operating criteria.
- A reasonable expectation that there will be a market for all or at least the expected sales quantities of production required to justify development.
- Evidence that the necessary production and transportation facilities are available or can be made available.
- Evidence that legal, contractual, environmental and other social and economic concerns will allow for the actual implementation of the recovery project being evaluated

To be included in the Reserves class, a project must be sufficiently defined to establish its commercial viability. There must be a reasonable expectation that all required internal and external approvals will be forthcoming and there is evidence of firm intention to proceed with the development within a reasonable time frame. A reasonable time frame for the initiation of the development depends on the specific circumstances and varies according to the scope of the project. While 5 years is recommended as a benchmark, a longer time frame could be applied where, for example, development of economic projects are deferred at the option of the producer for, among other things, market-related reasons, or to meet contractual or strategic objectives. In all cases, the justification for classification as Reserves should be clearly documented.

To be included in the Reserves class, there must be a high confidence in the commercial producibility of the reservoir as supported by actual production or formation tests. In certain cases, Reserves may be assigned on the basis of well logs and/or core analysis that indicate that the subject reservoir is hydrocarbon-bearing and is analogous to reservoirs in the same area that are producing or have demonstrated the ability to produce on formation tests.

2.2 Resources Categorization

The horizontal axis in the resources classification (Figure 1.1) defines the range of uncertainty in estimates of recoverable, or potentially recoverable, petroleum associated with a project. These estimates include both technical and commercial uncertainty components as follows:

- The total petroleum remaining within the accumulation (in-place resources).
- That portion of the in-place petroleum that can be recovered by applying a defined development project or projects.
- Variations in the commercial conditions that may impact the quantities recovered and sold (e.g., market availability, contractual changes).

Where commercial uncertainties are such that there is significant risk that the complete project (as initially defined) will not proceed, it is advised to create a separate project classified as Contingent Resources with an appropriate chance of commerciality.

2.2.1 Range of Uncertainty

The range of uncertainty of the recoverable and/or potentially recoverable volumes may be represented by either deterministic scenarios or by a probability distribution (see Deterministic and Probabilistic Methods, section 4.2).

When the range of uncertainty is represented by a probability distribution, a low, best, and high estimate shall be provided such that:

- There should be at least a 90% probability (P90) that the quantities actually recovered will be equal or exceed low estimate.
- There should be at least a 50% probability (P50) that the quantities actually recovered will be equal or exceed best estimate.
- There should be at least a 10% probability (P10) that the quantities actually recovered will be equal or exceed high estimate.

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When using the deterministic scenario method, typically there should be also be low, best, and high estimates, where such estimates are based on qualitative assessments of relative uncertainty using consistent interoperation guidelines. Under the deterministic incremental (risk based) approach, quantities at each level of uncertainty are estimated discreetly and separately (see Category Definitions and Guidelines, section 2.2.2).

These same approaches to describing uncertainty may be applied to Reserves, Contingent Resources, and Prospective Resources. While there may be significant risk and sub-commercial and undiscovered accumulations will not achieve commercial production, it is useful to consider the range of potentially recoverable quantities independently of such a risk or consideration of the resource class to which the quantities will be assigned.

2.2.2 Category Definitions and Guidelines

Evaluators may assess recoverable quantities and categorize results by uncertainty using the deterministic incremental (risk-based) approach, the deterministic scenario (cumulative) approach, or probabilistic methods (see “2001 Supplemental Guidelines,” Chapter 2.5). In many cases, a combination of approaches is used.

Use of consistent terminology (Figure 1.1) promotes clarity in communication of evaluation results. For reserves, the general cumulative terms best/high/low estimates are denoted as 1P/2P/3P, respectively. The associated incremental quantities are termed Proved, Probable and Possible. Reserves are a subset of, and must be viewed within context of, the complete resources classification system. While the categorization criteria are proposed specifically for Reserves, in most cases, they can be equally applied to Contingent and Prospective Resources Conditional upon their satisfying the criteria for discovery and/or development.

For Contingent Resources, the general cumulative terms low/best/high estimates are denoted as 1C/2C/3C respectively. For Prospective Resources, the general terms low/best/high estimates still apply. No specific terms are defined for incremental quantities within Contingent and Prospective Resources.

Without new technological information, there should be no change in the distribution of technically recoverable volumes and their categorization boundaries when conditions are satisfied sufficiently to reclassify a project from Contingent Resources to Reserves. All evaluations require application of a consistent set of forecast conditions, including assumed future costs and prices, for both classification of projects and categorization of estimated quantities recovered by each project (see Commercial Evaluations, section, 3.1).

Based on additional data and updated interpretations that indicate increased certainty, portions of Possible and Probable Reserves may be re-categorized as Probable and Proved Reserves.

Uncertainty in resources estimates is best communicated by reporting a range of potential results. However, if it is required to report a single representative result, the “best estimate” is considered the most realistic assessment of recoverable quantities. It is generally considered to represent the sum of provided and probable estimates (2P) when using the deterministic scenario or the probabilistic assessment methods. It should be noted that under the deterministic incremental (risk-based) approach, discrete estimates are made for each category, and they should not be aggregated without due consideration of their associated risk (see “2001 Supplemental Guidelines”, Chapter 2.5).

Table 1: Recoverable Resources Classes and Sub-Classes

Class/ Sub-class	Definition	Guidelines
Reserves	Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions.	<p>Reserves must satisfy four criteria: they must be discovered, recoverable, commercial, and remaining based on the development project(s) applied. Reserves are further subdivided in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their development and production status.</p> <p>To be included in the Reserves class, a project must be sufficiently defined to establish its commercial viability. There must be reasonable expectation that all required internal and external approvals will be forthcoming, and there is evidence of firm intention to proceed with development within a reasonable time frame.</p> <p>A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. While 5 years is recommended as a benchmark, a longer time frame could be applied where, for example, development of economic projects are deferred at the option of the producer for, among other things, market related reasons, or to meet contractual or strategic objectives. In all cases, the justification for classification as Reserves should be clearly documented.</p> <p>To be included in the Reserves class, there must be a high confidence in the commercial producibility of the reservoir as supported by actual production or formation tests. In certain cases, Reserves may be assigned on the basis of well logs and/or core analysis that indicate that the subject reservoir is hydrocarbon-bearing and is analogous to reservoirs in the same area they are producing or have demonstrated the ability to produce on formation basis.</p>
On Production	The development project is currently producing and selling petroleum to	The key criterion is that the project is receiving income from sales, rather than the approved development project necessarily being complete. This is

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	market.	the point at which the project “chance of commerciality” can be said to be 100%. The project “decision gate” is the decision to initiate commercial production from the project.
Approved for Development	All the necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is under way.	At this point, it must be certain that the development project is going ahead. The project must not be subject to any contingencies such as outstanding regulatory approvals or sales contracts. Forecast capital expenditures should be included in the reporting entity’s current or following years approved budget. The project “decision gate” is the decision to start investing capital in the construction of production facilities and/or drilling development wells.
Justified for Development	Implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting, and there are reasonable expectations that all necessary approvals/contracts will be obtained.	In order to move to this level of project maturity, and hence have reserves associated with it, the development project must be commercially viable at the time of reporting, based on the reporting entity’s assumptions of future prices, costs, etc. (“forecast case”) and the specific circumstances of the project. Evidence of a firm intention to proceed with the development within a reasonable time frame will be sufficient to demonstrate commerciality. There should be a development plan in sufficient detail to support the assessment of commerciality and a reasonable expectation that any regulatory approvals or sales contracts required prior to project implementation will be forthcoming. Other than such approvals/contracts, there should be no known contingencies that could preclude the development from proceeding within a reasonable timeframe (see Reserve class). The project “decision gate” is the decision by the reporting entity and its partners, if any, that the project has reached a level of technical and commercial maturity sufficient to justify proceeding with development at that point in time.
Contingent Resources	Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations by application of development projects, but which are not currently considered to be commercially recoverable due to one or more contingencies.	Contingent Resources may include, for example projects for which there are currently no viable markets, or where commercial recovery is dependent on technology under development, or where evaluation of the accumulation is insufficient to clearly assess commerciality. Contingent Resources are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their economic status.
Development Pending	A discovered accumulation where project activities are ongoing to justify commercial development in the foreseeable future.	The project is seen to have reasonable potential for eventual commercial development, to the extent that further data acquisition (e.g. drilling, seismic data) and/or evaluations are currently ongoing with a view to confirming that the project is commercially viable and providing the basis for the selection of an appropriate development plan. The critical contingencies have been identified and are reasonably expected to be resolved within a reasonable time frame. Note that disappointing appraisal/evaluation results could lead to a re-classification of the project to “On Hold” or “Not Viable” status.
Development Unclarified or on hold	A discovered accumulation where project activities are on hold and/or where justification as a commercial development may be subject to significant delay.	The project is seen to have potential for eventual commercial development, but further appraisal/evaluation activities are required to clarify the potential for eventual commercial development. Development may be subject to significant time delay. Note that a change in circumstances, such that there is no longer a reasonable expectation that a critical contingency can be removed in the foreseeable future, for example, could lead to a reclassification of the project to “Not Viable” status. The project “decision gate” is the decision to either proceed with additional evaluation designed to clarify the potential for eventual commercial development or to temporarily suspend or delay further activities pending resolution of external contingencies.
Development Not Viable	A discovered accumulation for which there are no current plans to develop or to acquire additional data at the time due to limited production potential.	The project is not seen to have potential for eventual commercial development at the time of reporting, but theoretically recoverable quantities are recorded so that the potential opportunity will be recognized in the event of a major change in technology or commercial conditions. The project “decision gate” is the decision not to undertake any further data acquisition or studies on the project for the foreseeable future.
Prospective Resources	Those quantities of petroleum which are estimated, as of a given date, to be potentially recoverable from	Potential accumulations are evaluated according to their chance of discovery and, assuming a discovery, the estimated quantities that would be recoverable under defined development projects. It is recognized that

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	undiscovered accumulations.	the development programs will be significantly less detail and depend more heavily on analog developments in the earlier phrases of exploration.
Prospect	A project associated with the potential accumulation that is sufficiently well defined to represent a viable drilling target.	Project activities are focused on assessing the chance of discovery and, assuming discovery, the range of potential recoverable quantities under a commercial development program.
Lead	A project associated with a potential accumulation that is currently poorly defined and requires more data acquisition and/or evaluation in order to be classified as a prospect.	Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to confirm whether or not the lead can be matured into a prospect. Such evaluation includes the assessment of the chance of discovery and, assuming discovery, the range of potential recovery under feasible development scenarios.
Play	A project associated with a prospective trend of potential prospects, but which requires more data acquisition and/or evaluation in order to define specific leads or prospects.	Project activities are focused on acquiring additional data and/or undertaking further evaluation designed to define leads or prospects for more detailed analysis of their chance of discovery and, assuming discovery, the range of potential recovery under hypothetical development scenarios.

Table 2: Reserves Status Definitions and Guidelines

Status	Definition	Guidelines
Developed Reserves	Developed Reserves are expected quantities to be recovered from existing wells and facilities	Reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor compared to the cost of a well. Where required facilities become unavailable, it may be necessary to reclassify Developed Reserves as Undeveloped. Developed Reserves may be further sub classified as Producing or Non-Producing.
Developed Producing Reserves	Developed Producing Reserves are expected to be recovered from completion intervals that are open and producing at the time estimate.	Improved recovery reserves are considered producing only after the improved recovery project is in operation.
Development Non-Producing Reserves	Developed Non-Producing Reserves include shut-in and behind-pipe Reserves.	Shut-in Reserves are expected to be recovered from (1) completion interval which are open at the time of the estimate but which have not yet started producing, (2) wells which were shut-in for market conditions or pipeline connections, or (3) wells not capable of production for mechanical reasons. Behind-pipe Reserves are expected to be recovered from zones in existing wells which require additional completion work or future completion prior to start of production. In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a well
Undeveloped Reserves	Undeveloped Reserves are quantities expected to be recovered through future investments.	(1) from new wells on undrilled acreage in known accumulations, (2) from deepening existing wells to a different (but known) reservoir, (3) from infill wells that will increase recovery, or (4) where a relatively large expenditure (e.g. when compared to the cost of drilling a new well) is required to (a) re-complete an existing well or (b) install production or transportation facilities for primary or improved recovery projects.

Table 3: Reserves Category Definitions and Guidelines

Category	Definition	Guidelines
Proved Resources	Proved Reserves are those quantities of petroleum, which by analysis of geosciences and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined economic conditions, operating methods, and government regulations.	If deterministic methods are used, the term reasonable certainly is intended to express a high degree of confidence that the quantities will be recovered. If probabilistic methods are used, there should be at least a 90% probability that the quantities actually recovered will equal or exceed the estimate. The area of the reservoir considered as proved includes (1) the area defined by drilling and defined by fluid contacts, if any, and (2) adjacent un-drilled portions of the reservoir that can reasonably be judged as continuous with it and commercially productive on the basis of available geosciences and engineering data.

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		<p>In the absence of data on fluid contacts, Proved quantities in a reservoir are limited by the lowest known hydrocarbon (LKH) as seen in a well penetration unless otherwise indicated by definitive geosciences, engineering, or performance data. Such definitive information may include pressure gradient analysis and seismic indicators. Seismic data alone may not be sufficient to define fluid contacts for Proved reserves (see “2001 Supplemental,” Chapter 8).</p> <p>Reserves in undeveloped locations may be classified as proved that:</p> <ul style="list-style-type: none"> • The locations are in un-drilled areas of the reservoir that can be judged with reasonable certainty to be commercially productive. • Interpretations of available geosciences and engineering data indicate with reasonable certainty that the objective formation is latterly continuous with drilled proved locations. <p>For Proved Resources, the recovery efficiency applied to these reservoirs should be defined based on a range of possibilities supported by analogs and sound engineering judgment considering the characteristics of the Proved area and the applied development program.</p>
Category	Definition	Guidelines
Probable Reserves	Probable Reserves are those additional reserves which analysis of geosciences and engineering data indicate are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves.	<p>It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least 50% probability that the actual quantities recovered will equal or exceed the 2P estimates.</p> <p>Probable Reserves may be assigned to areas of a reservoir adjacent to Proved where data control or interpretations of available data are less certain. The interpreted reservoir continuity may not meet the reasonable certainty criteria.</p> <p>Probable estimates also include incremental recoveries associated with project recovery efficiencies beyond that assumed for Proved.</p>
Possible Reserves	Possible Reserves are those additional reserves which analysis of geosciences and engineering data indicate are less likely to be recoverable than Probable Reserves.	<p>The total quantities ultimately recovered from the project have a low probability to exceed the sum of Proved plus Probable plus (3P), which is equivalent to the high estimate scenario. When probabilistic methods are used, there should be at least a 10% probability that the actual quantities recovered will equal or exceed the 3P estimate.</p> <p>Possible Reserves may be assigned to area of a reservoir adjacent to Probable where data control and interpretations of available data progressively less certain. Frequently, this may be in areas where geosciences and engineering data are unable to clearly define the area and vertical reservoir limits of commercial production from the reservoir by a defined project.</p> <p>Possible estimates also include incremental quantities associated with project recovery efficiencies beyond that assumed for Probable.</p>
Probable and Possible Reserves	(See above for separate criteria for Probable Reserves and Possible Reserves)	<p>The 2P and 3P estimates may be based on reasonable alternative technical and commercial interpretations within the reservoir and/or subject project that are clearly documented, including comparisons to results in successful similar projects.</p> <p>In conventional accumulations, Probable and/or Possible Reserves may be assigned where geosciences and engineering data identify directly adjacent portions of a reservoir within the same accumulation that may be separated from Proved areas by minor faulting or other geological discontinuities and have not been penetrated by a well bore but are interpreted to be in communication with the known (Proved) reservoir. Probable or Possible Reserves may be assigned to areas that are structurally higher than the Proved area. Possible (and in some cases, Probable) Reserves may be assigned to areas that are structurally lower than the adjacent Proved or 2P area.</p> <p>Caution should be exercised in assigning Reserves to adjacent reservoirs isolated by major, potentially sealing, faults until this reservoir is penetrated and evaluated as commercially productive. Justification for</p>

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		<p>assigning Reserves in such cases should be clearly documented. Reserves should not be assigned to areas that are clearly separated from a known accumulation by non-productive reservoir (i.e. absence of reservoir, structurally low reservoir, or negative test results): such areas may contain Prospective Resources.</p> <p>In conventional accumulations, where drilling has defined a highest known oil (HKO) evaluation and there exists the potential for an associated gas cap, Proved oil Reserves should only be assigned in the structurally higher portions of the reservoir if there is reasonable certainty that such portions are initially above bubble point pressure based on documented engineering analysis. Reservoir portions that do not meet this certainty may be assigned as Probable and Possible oil and/or gas based on reservoir fluid properties and pressure gradient interpretations.</p>
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**APPENDIX A
SUMMARY OF RESERVOIR PARAMETERS
CASSINI PROSPECT - KERN COUNTY, CA**

Reservoir	Category	Area (Acres)			Net Rock Volume (Acre Feet)			Porosity (Decimal)		
		Low	Best	High	Low	Best	High	Low	Best	High
Monterey	Prospective	500	775	1200	400,000	759,500	1,440,000	0.05	0.06	0.08

Reservoir	Category	Oil Saturation (Decimal)			Form. Vol. Factor (Decimal)			Recovery Factor (Decimal)		
		Low	Best	High	Low	Best	High	Low	Best	High
Monterey	Prospective	0.50	0.53	0.56	1.65	1.46	1.30	0.06	0.07	0.08